

2010

Terrorism in Australia: Myth or reality? A psychometric study into the Western Australian public's perception of terrorism

Richard Sargent
Edith Cowan University

Follow this and additional works at: https://ro.ecu.edu.au/theses_hons



Part of the [Quantitative Psychology Commons](#), and the [Social Psychology Commons](#)

Recommended Citation

Sargent, R. (2010). *Terrorism in Australia: Myth or reality? A psychometric study into the Western Australian public's perception of terrorism*. https://ro.ecu.edu.au/theses_hons/1240

This Thesis is posted at Research Online.
https://ro.ecu.edu.au/theses_hons/1240

Edith Cowan University

Copyright Warning

You may print or download ONE copy of this document for the purpose of your own research or study.

The University does not authorize you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site.

You are reminded of the following:

- Copyright owners are entitled to take legal action against persons who infringe their copyright.
- A reproduction of material that is protected by copyright may be a copyright infringement. Where the reproduction of such material is done without attribution of authorship, with false attribution of authorship or the authorship is treated in a derogatory manner, this may be a breach of the author's moral rights contained in Part IX of the Copyright Act 1968 (Cth).
- Courts have the power to impose a wide range of civil and criminal sanctions for infringement of copyright, infringement of moral rights and other offences under the Copyright Act 1968 (Cth). Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

**Terrorism in Australia: Myth or Reality? A Psychometric Study into the
Western Australian Public’s Perception of Terrorism**

By

Richard Sargent. BSc (Security)



**A Thesis Submitted in Partial Fulfilment of the Requirements for the Award of Bachelor
of Science (Security) Honours.**

**School of Computer and Security Science
Faculty of Computing, Health & Science
Edith Cowan University**

Principal Supervisor Dr David Jonathan Brooks

Submission Date

ABSTRACT

Terrorism is not a new concept as terrorist individuals and organisations since time immemorial have used the threat of violence or actual violence to generate fear in individuals, organisations and governments alike. Fear is a powerful weapon and it is used in order to gain political, ideological or religious objectives. The attacks on the World Trade Centre and the Pentagon on the 11th September 2001 (9/11) highlighted the dangers of the inadequate intelligence, border security and immigration practices that led to this event. The attacks were a security wake up call not only for the United States of America but for the entire world.

The 9/11 attacks and other more recent terrorist attacks such as the Bali (12th October 2002 & 1st October 2005), Madrid (11th March 2004) and London (7th July 2005) bombings have sent security shockwaves around the world, as governments scramble to ensure that their own anti-terrorism security strategies are adequate to meet this new threat. The Federal Australian government undertook a range of security reviews and participated in a number of regional forums, bilateral pacts and international counter terrorism aid partnerships. Domestically, Australia also enhanced its capacity to respond to a possible terrorism event through multiple security enhancements across key areas including border security, defence and intelligence based agencies. In partnership with these new security initiatives a national public counter terrorism campaign was implemented in December 2002.

Due to the unprecedented nature of these terrorist events, there has been little specific research into how terrorist events have impacted on the Australian public or how the public's social psychometric risk perception of terrorism contrasts with other known risks. This study's purpose was to address this shortfall in knowledge, by examining key social and security changes in Australian society post 9/11. The study used a number of primary and secondary data sources, a literature review and a research survey to address the study's research questions.

The research survey was based on a Likert scale devised to measure the public's psychometric risk perceptions of terrorism. This research compared terrorism to other similar risks and found it ranked second highest in terms of dread risk and midrange in terms of familiarity risk. The study recommended changes to current first response management practices and reinforced that there was an ongoing need for research into public risk perception and public awareness safety campaigns. It is only through an understanding of the public's reactions to risk that policy and decision-makers can promote and implement effective health, safety and security reforms that will be of benefit to both industry and the general community alike.

COPYRIGHT and ACCESS DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

(i) incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education;

(ii) contain any material previously published or written by another person except where due reference is made in the text; or

(iii) contain any defamatory material

Signed....

Dated.....

ACKNOWLEDGEMENTS

I would like to acknowledge and express my gratitude to Doctor David Brooks who provided immeasurable assistance, guidance and support in completing this project.

I would also like to express my sincere thanks to the staff of the security science faculty whose guidance and support over many years has helped me to grow and mature to this level of development.

An extreme debt of appreciation and gratitude has to go to my rock, my wife and long suffering partner Ruth who has given her time selflessly and has laboured for many hours proof reading, editing and giving her constructive criticism.

To all those who took the time to participate in this project, your cooperation and assistance has been invaluable and I thank each of you for taking part.

Thanks also go to my family, Margaret, Lee, Mike, Christine and Keith who have been my foundations of support throughout my 'university career'.

Finally special thanks go to my good friends Michael Pajich, Nathan Alday, Jemma Thurston, and Roselyn Dinkgreve who through their humour, patience and understanding have allowed me to retain my sanity while completing this task.

LIST OF TABLES

Table 1.1	Appendix B Terrorist Attacks Involving Australian Fatalities, Injuries or Damage to Australian Interests.....	134
Table 1.2	Ten Year Explosive Target Summary from 1998 to 2007.....	7
Table 1.3	Ten Year Explosive Target Summary.....	8
Table 2.1	Modern Constructs and Definitions of Public Risk Perception.....	24
Table 4.1	Pilot Study Two: Reliability Analysis - Scale (Cronbach Alpha).....	52
Table 4.2	Pearson Correlation Values.....	55
Table 4.3	Pearson's Product Moment Correlation Coefficient Table.....	56
Table 5.1	Age Groups by Gender Category.....	63
Table 5.2	Terrorism Risk Awareness (Anti-Terrorism Campaigns).....	69
Table 5.3	Main Study Reliability Analysis - Scale (Cronbach Alpha).....	71
Table 5.4	Pearson's Product Moment Correlation Coefficient.....	72
Table 6.1	Appendix F Principal Australian Security Improvements Post 9/11.....	147

LIST OF FIGURES

Figure 1.1	The Study's Overview.....	11
Figure 2.1	Psychometric risk paradigm: Location and Risk Characteristics of 81 Risk Based Hazards.....	21
Figure 2.2	The Social Amplification of Risk Framework Model.....	25
Figure 2.3	Cronbach's Co-efficient Alpha Formula.....	30
Figure 3.1	Likert Scale Example.....	36
Figure 4.1	Pilot Study Spatial Factor Representation.....	50
Figure 4.2	Factor Characteristic Profiles of Each Activity/Technology.....	51
Figure 4.3	Comparison of Slovic's Psychometric Study with the Pilot Study Results.....	53
Figure 5.1	Combined Spatial Factor Representation of All Results.....	65
Figure 5.2	Main Study Factor Characteristic Profiling.....	67

TABLE OF CONTENTS

CHAPTER 1 – INTRODUCTION	1
1.1 Introduction	1
1.2 Terrorism Public Awareness Campaigns	1
1.2.1 Let's Look out for Australia Campaign	2
1.2.2 Help Protect Australia from Terrorism: Every Piece of Information Helps	2
1.2.3 National Security: Every Detail Helps Campaign	4
1.3 Transnational Extremists Perception of Western Democratic Societies	5
1.4 Terrorism in Australia	6
1.5 The Significance of the Study	8
1.6 The Purpose of the Study	9
1.7 Research Questions	9
1.8 Objectives of the Study	10
1.9 The Study's Overview	10
1.10 Conclusion	12
 CHAPTER 2 – REVIEW OF THE LITERATURE	 13
2.1 Introduction	13
2.2 Psychometrics Background Overview	13
2.3 Psychometric Modern Foundations	17
2.4 Theoretical Framework: The Psychometric Paradigm	19
2.5 Risk Perception	22
2.6 Social Amplification of Risk Framework (SARF)	24
2.7 Public Perceptions and Terrorism	26
2.8 Research Methodology: The Search for Truth	28
2.8.1 Validity	28
2.8.2 Reliability	29
2.8.3 Equivalence Forms Reliability Measurement	30
2.8.4 Cronbach's Co-Efficient Alpha Test	30
2.8.5 Expert Peer Review	31
2.9 Conclusion	31
 CHAPTER 3 – MATERIALS AND METHODS	 33
3.1 Introduction	33
3.2 Key Study Objectives	33
3.3 The Study's Overview	34
3.3.1 Problem Definition	34
3.3.2 Likert Scale and Survey Design	35
3.3.3 Target Sampling	38
3.3.4 Data Collection	38
3.3.5 Data Processing, Analysis and Interpretation	39

3.3.6	Quantative Research Data Analysis	40
3.3.7	Qualitative Research Data Analysis	41
3.4	The Study Controls	41
3.5	The Study's Experimental Control	42
3.6	Reliability and Validity Methodology	42
3.7	Ethics	43
3.7.1	Informed Consent	44
3.7.2	Research Merit and Integrity	44
3.7.3	Justice	45
3.7.4	Beneficence	45
3.7.5	Respect	46
3.8	Conclusion	46
CHAPTER 4 – PILOT STUDY		48
4.1	Introduction	48
4.2	Pilot Study's Background	48
4.3	Pilot Study's Methodology and Analysis	49
4.3.1	Factor Characteristic Profiling	51
4.4	Pilot Study Reliability Analysis	52
4.5	Demographic Validity Analysis	54
4.5.1	Gender Risk Perception	54
4.5.2	Age Risk Perception	54
4.6	Pearson's Product Moment Correlation Coefficient	55
4.7	Study Limitations	56
4.7.1	The Nature of Risk	56
4.7.2	Study Methodology	57
4.7.3	Research Design	57
4.7.4	Likert Surveys	58
4.8	Conclusion	59
CHAPTER 5 – ANALYSIS		61
5.1	Introduction	61
5.2	Study's Background	62
5.3	Main Study Demographics	62
5.3.1	Gender and Age Demographics	63
5.3.2	Gender Risk Perception	63
5.3.3	Age Group Risk Perception	63
5.4	Main Study Analysis	65
5.5	Main Study Factor Characteristic Profiling	67
5.6	Effectiveness of Anti-Terrorism Awareness Campaigns	69
5.7	Main Study Frequency Analysis Results	69
5.8	Study Reliability and Validity	71
5.8.1	Main Study Reliability Analysis	71
5.9	Pearson's Product Moment Correlation Coefficient	72

5.10	Study Limitations	73
5.10.1	Likert Survey Limitations	73
5.10.2	Survey Design	73
5.10.3	Psychometric Paradigm Limitations	73
5.11	Conclusion	76
CHAPTER 6 – INTERPRETATIONS		78
6.1	Introduction	78
6.2	Overview of the Interpretations	78
6.3	Age and Gender Demographics	79
6.3.1	Gender Demographics	79
6.3.2	Age Demographics	79
6.4	Research Question 1: How Has Recent Terrorist Events Impacted on the Australian Public?	80
6.4.1	Recent Terrorist Events: Their Impact on Australians	80
6.4.2	Terrorism and Public Exposure	81
6.4.3	Public Perception of Terrorism: Immediate Effects	84
6.4.4	Terrorism and Fatal Effects	84
6.4.5	Terrorism Risks to Future Generations	86
6.4.6	Governmental Regulation and the Control of Terrorism	87
6.5	Research Question 2: What is the Current Public Perception of Terrorism as Compared to Other Public Risks in an Australian Context?	88
6.5.1	Spatial Factor Representation	89
6.6	Study Risks and Terrorism	89
6.7	Assumption 1 : Are Current Australian Government Anti-Terrorism Campaigns Effective in the View of the Public?	92
6.8	Conclusion	93
CHAPTER 7 – CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS		95
7.1	Introduction	95
7.2	Summary of the Study	95
7.3	Study Results	97
7.4	Research Question 1: How Has Recent Terrorist Events Impacted on the Australian Public?	99
7.5	Research Question 2: How Does the Public’s Psychometric Risk Perception of Terrorism Contrast with Other Known Risks?	99
7.6	Study Assumption 1: Are Australian Government Anti-Terrorism Campaigns Effective in the View of the Public?	101
7.7	The Study’s Limitations	101
7.8	Study Recommendations and Further Research	104
7.9	Conclusion	106

REFERENCES 107

APPENDICES

Appendix A	Australian Anti-Terrorism Based Legislation Introduced from 2002 ..	131
Appendix B	Table 1.1 Terrorist Attacks Involving Australian Fatalities, Injuries or Damage to Australian Interests	134
Appendix C	Participants Information Letter	141
Appendix D	Informed Consent Form	142
Appendix E	Pilot and Main Likert Survey	143
Appendix F	Table 6.1: Principal Australian Security Improvements Post 9/11.....	147

CHAPTER 1

INTRODUCTION

1.1 Introduction

On 11th September 2001 ("9/11") nineteen terrorists hijacked four commercial passenger aircraft and deliberately flew them into the World Trade Centre (WTC), the Pentagon and (only due to interference from passengers onboard), into the ground in Shanksville, Pennsylvania. According to the 9/11 Commission Report (2004, p.p. 7-14) the final death toll in the WTC hijackings was 2996 people. In the Pentagon hijacking 125 people also lost their lives. A further 44 people died when a struggle between terrorists and passengers for the controls of United Airlines, Flight 93 caused the aircraft to crash into the ground in Shanksville Pennsylvania (Federal Bureau of Investigation, 2003).

The resulting deaths of this tragic event represented people from 80 different countries, including 10 Australians (Spektor, 2004). The scourge of terrorism was suddenly thrust into the media and public spotlight on a scale never witnessed before in modern history. The ramifications of this event in Australia were vast, in both a domestic and an international context. Australia's strong political, military, economic and social ties to the United States of America led to the invocation of the Australia, New Zealand and United States Security Treaty (ANZUS) on the 14th September 2001. The treaty was primarily designed as a military pact between America, Australia and New Zealand, where each country would come to the aid of another if they were attacked by a foreign power (Nelson, 2006).

The study has three aims; to examine how recent terrorist events have impacted on the Australian public; to analyse how the public's psychometric risk perception of terrorism contrasts with other known risks; and to investigate if the Western Australian public viewed current Australian government anti-terrorism campaigns as being effective. These aims will be addressed by focusing the study on the changes in Australia's society post 9/11 and the resulting social and security repercussions that have both concerned and affected the general public to this day.

1.2 Terrorism Public Awareness Campaigns

In late 2002, there was a growing anguish amongst the general public about the possibility of a terrorist attack occurring on Australian soil. Terrorism was highlighted at the time due to the MV Tampa affair on the 24th August 2001, the 11th September 2001 attacks on the World

Trade Centre and the Pentagon and more recently the terrorist attack in Bali on the 12th October 2002. This particular attack resulted in 88 Australian fatalities. In addition home-grown religious terrorism was also starting to emerge as events surrounding convicted Australian terrorist Jack Roche were beginning to become public knowledge (Department of Foreign Affairs and Trade, 2004a, pp.11-73).

1.2.1 Let's Look out for Australia Campaign

In December 2002, in response to this growing threat to Australian national security, the Australian federal government launched a national public awareness campaign entitled "*Let's Look out for Australia*", which was also known as the "Be alert not alarmed campaign". The campaign was not just television based, but was also broadcast on radio, press, public transit and outdoor advertising in 30 languages. This media breadth represented its seriousness and broad reach to contact multicultural Australia (Attorney-General's Department 2007a).

The Let's Look out for Australia campaign's aim was to increase public awareness about the need for a raft of growing security measures and sometimes controversial anti-terrorism based legislation that filled gaps in the Commonwealth Criminal Code. The new legislation aimed to protect ordinary Australians from the threat of a terrorist attack occurring within Australia. In 2002 alone, anti-terrorism based legislation included 15 new or revised Acts (See Appendix A). Due to these unprecedented changes, there was a need to inform and reassure the general public of the need to impose such measures. One of the aims of the campaign was to integrate the public as the eyes and ears of the security and intelligence agencies. It was hoped that once informed of the threats to Australia, that Australians would be encouraged to report suspicious activity to the authorities via a national security hotline.

1.2.2 Help Protect Australia from Terrorism: Every Piece of Information Helps

The success of the "*Let's Look out for Australia*" campaign led to a second public awareness anti-terrorism campaign entitled "*Help Protect Australia from Terrorism: Every Piece of Information Helps*" which was launched in September 2004. The campaign had similar foundations and strategies as the first campaign and continued to highlight to all Australians that they should remain vigilant for possible suspicious terrorist related activity. The emphasis of this was highlighted by a series of events, including the September 9th 2004 Australian embassy truck bombing in Jakarta and the continued detainment of Australian terrorist suspects David Hicks (Muhammad Dawood) and Mamdouh Habib. Additional causes for concern involved the suspicious terrorism related activities surrounding Willie Brigitte

(Mohammed Abderrahman) and his associate Abu Hamza (Faheem Khalid Lodhi). Combined with these events were sustained threats from overseas-based terrorist organisations that Australia itself was now considered a legitimate target for a terrorist strike due to Australia's involvement in "the war on terror" (Department of Foreign Affairs and Trade, 2004a, p 66).

The primary aim of this second campaign was to reinforce the first campaign on the subject of awareness which was achieved by giving the public warning signs of possible terrorist related activity, some examples included:

- "Unusual surveillance, videotaping or photography of official buildings, energy installations and other important sites.
- Vehicles parked near significant buildings or in busy public places for long periods of time.
- Packages or bags abandoned in public places such as malls, buildings or train stations.
- Suspicious purchases or possession of large quantities of fertilizer, chemicals or explosives.
- Unusual uses of accommodation such as garages being used at odd times of the day or night"

(Lets look out for Australia, National Press Advertisement, 2004).

A key element in the campaign was a national mail out to all Australian households, which provided an anti-terrorism / emergency response information booklet, containing advice from counter-terrorism, national security and emergency response agencies. Specifically the booklet contained advice on preparing for an emergency, giving first aid and recommendations to protect Australians living, working or travelling overseas. Finally, contact details were also provided on whom to contact in case of emergency or to report suspicious activity. A fridge magnet was also included, which contained state and federal emergency contacts, important phone numbers such as the local doctor and the national security anti-terrorism hotline number. Both the booklet and fridge magnet were available in a range of languages, designed to encompass as many Australians as possible (Williams, 2003).

A secondary aim of the campaign was to encourage the public to report suspicious behaviour via a 24-hour national security hotline, which could be used to provide information, receive advice and report suspicious behaviour. Information that was received was passed onto

relevant state, territory and or federal government police, security and intelligence agencies where the data was assessed, evaluated, and prioritized to achieve an appropriate response that ensued safety and security for all Australians (Williams, 2003).

It could be suggested that a third aim of the campaign was to reassure the public of the authorities need for additional national security and counter-terrorism legislation to deal with the current threat. During this period the Australian government introduced another 22 new or revised Acts (see Appendix A)

1.2.3 National Security: Every Detail Helps Campaign

The third campaign entitled *National Security: Every Detail Helps* was launch in August 2007. The primary aim of this campaign was to reinforce the two previous campaigns aims of awareness and vigilance of one's surroundings. Australia by this time had now opened a number of legal, political, social (foreign aid) and military fronts in an effort to support our allies in the "war on terror". Australian political figures voiced their continuing public support for the war on terrorism in both national and international forums. Australia's continuing military involvement and public criticism against well known terrorist individuals and groups had arguably placed Australia and Australians in harm's way. This point was increasingly emphasised in terrorist threats and propaganda at the time, as Australia and Australian senior ministers were by now being increasingly singled out as 'legitimate' targets for terrorists to pursue (Department of Foreign Affairs and Trade, 2004a).

These issues combined with a series of alleged home-grown terrorism incidents, in particular in 2005 and 2006, which reaffirmed the government's position to initiate the third campaign. According to the Attorney General's Department (2007), the two previous campaigns had been well received by the Australian public and since December 2002, had resulted in over 93,000 calls, letters and emails from concerned public citizens. A secondary aim to the third campaign was to demystify the national security hotline to the Australian public. In particular the campaign demonstrated how the hotline operates and what happens to information that the public supply. Like its two predecessors, the campaign aimed at reaching multicultural Australia and was broadcast via television, radio, press, public transit and outdoor advertising in 30 languages other than English (Attorney Generals Department, 2008). As with the two previous campaigns a raft of legislation was introduced during this period (see Appendix A).

It could be suggested that Australia's anti-terrorism campaigns and their subsequent laws were necessary for a number of reasons, including Australia's invocation of the ANZUS treaty and Australia's sustained vocal, economic and military support to the United States and other

coalition partners in the wars in Iraq and Afghanistan. Australia's continued anti-terrorism support for its regional neighbours and finally, the increasing ease of communications and other related support that the global terrorist movements enjoy via globalisation initiatives. Australia's profile was increasingly being raised on the world's stage, subsequently resulting in a number of key domestic, regional and international terrorist individuals and organisations consistently singling out Australia specifically for an attack including Osama Bin Laden's Al Qaida network (Department of Foreign Affairs and Trade, 2004a).

1.3 Transnational Extremists Perception of Western Democratic Societies

It can be argued that Australia and Australians are already a target for terrorist based actions. According to the Department of Foreign affairs and Trade (2004, p. 67), this is due to a number of reasons including:

"Transnational extremist-Muslim terrorists imagine us as part of a Zionist - Christian conspiracy aimed at bringing impiety, injustice, repression and humiliation to the Muslim world. Weakening the influence of the West would advance their political goals by helping undermine those Muslims they view as corrupt and open to Western influence. We are seen as standing in the way of their goal to transform the Muslim world into a Taliban-style society. According to their simplistic worldview, we are part of the Christian West, which, to them, is un-Islamic and therefore illegitimate.

The core values we hold and which are intrinsic to our success as a liberal democratic culture are anathema to these extremists. For them, our beliefs in democratic process, racial and gender equality, religious tolerance and equality of opportunity are mere human inventions at odds with God's law. These values impede their political goals. They are confronted by the reality that it is not only people of the West who value such freedoms.

We advance our values through an active foreign policy. We energetically support democracy, human rights and religious freedoms in our international contribution and through our participation in international forums like the United Nations. Our close alliance with the United States, our role in East Timor, our early and active engagement in the war in Afghanistan, and our involvement in the Coalition in Iraq are often cited by transnational terrorists as reasons for targeting us"

Australians are however no strangers in regards to terrorism, terrorist attacks involving Australian fatalities, injuries or damage to Australian interests on domestic and foreign soil has been occurring since 1970 (Appendix B, Table 1.1).

1.4 Terrorism in Australia

Terrorism on Australian soil is almost unknown in Australia's recent history. The most well known incident occurred on 13th February 1978 when a bomb was set off during the Commonwealth Heads of Government Meeting (CHOGM) held at the Hilton Hotel in Sydney, killing two people. In response to this attack, the Australian Federal Police (AFP) set up the Australian Bomb Data Centre (ABDC) in 1978 (Australian Federal Police, 2007).

According to the Australian Federal Police (2007), the charter of the ABDC is to "collect, collate, interpret and disseminate data gathered from within Australia and overseas, concerning explosives and incendiaries, whether commercial, military or improvised... The centre is concerned both with criminals who use explosives for their own benefit and with those who use explosives and bombs for politically motivated violence" Unfortunately, for national security reasons, much of this data is restricted to national and overseas law enforcement agencies. In its unclassified 2007 annual report, the ABDC states that it considers hoaxes and bombing attacks as crimes and therefore does not distinguish between criminal attacks and terrorism. The ABDC's declassified 2007 report provides a good indication of bomb related crimes suffered by the Australian community over a ten year period (1998-2007) (Table 1.2).

Reported Incidents by Year - All States

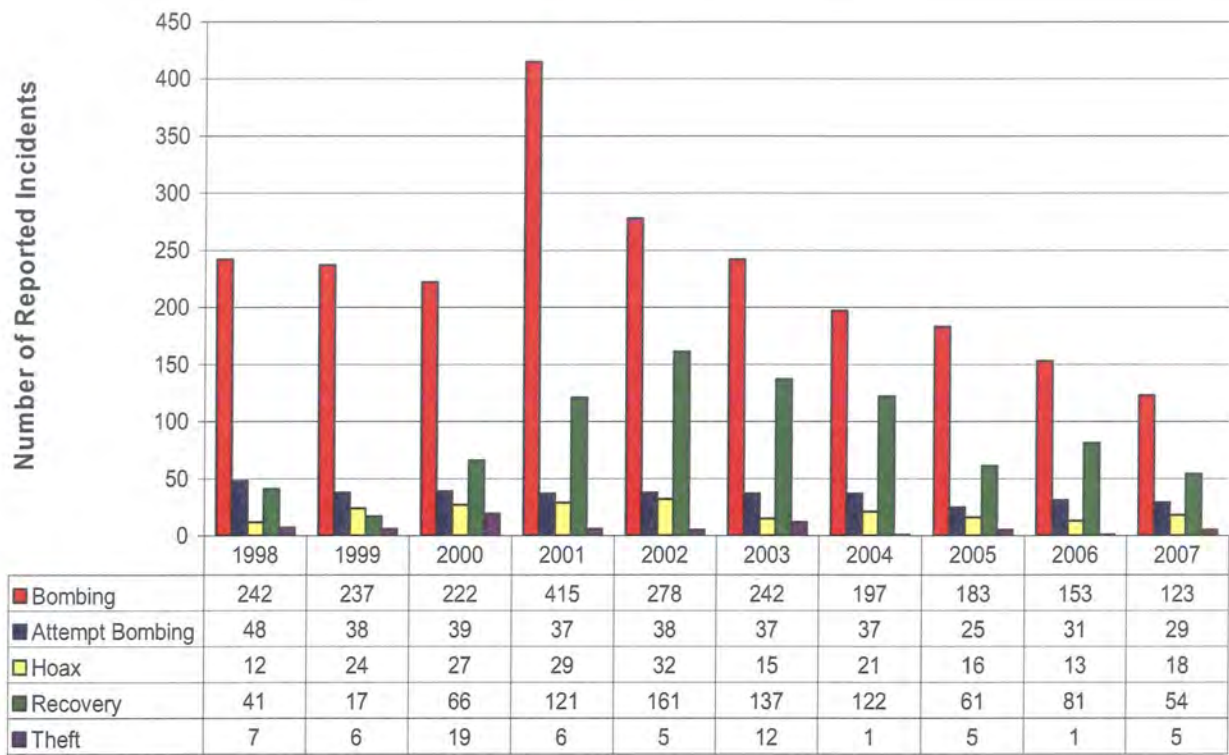


Table 1.2 Ten Year Explosive Incident Summary from 1998 - 2007 (Australian Federal Police, 2007a, p.7)

The threat from these bomb related incidents are significant, as there have been many bomb related target locations where the general public has been at risk (Table 1.3).

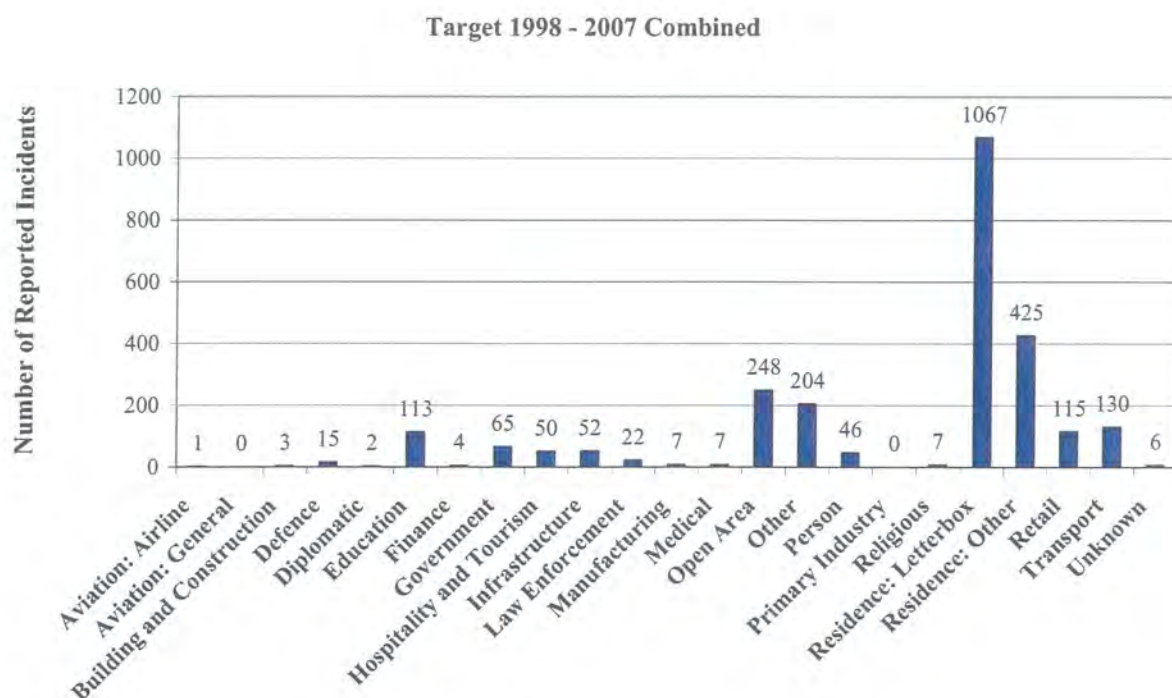


Table 1.3 Ten Year Explosive Target Summary (Australian Federal Police, 2007b, p.9)

1.5 The Significance of the Study

Due to the unprecedented nature of these recent terrorist events, there is very little specific research into how the public’s social psychometric risk perception of terrorism contrasts with other known risks. This study addressed this issue by examining changes in Australia’s society post 9/11, in particular, the study focused on social and security repercussions that concerned the general public. By using primary and secondary data sources, a literature review and a research survey, it was possible to produce an evaluation of the public’s perception of how terrorism contrast with other known risks. Using this data, the study was able to take a snapshot of the public’s perception of changes to Australia’s social and national security landscape.

To this end, the study aimed to increase the knowledge available to policy makers, risk analysts, risk communications experts, decision-makers and the general public. By using psychometric risk related research, it was hoped professionals will gain a deeper understanding of how lay people perceive a terrorist risk. It is only through understanding public reactions to risk can policy and decision-makers promote and implement effective

health, safety and security reforms that will be of benefit to both industry and the general community.

Compared to other professions, the discipline of security is a relatively young industry (McClure, 1997). This study contributed to the growing body of knowledge and tools needed for the security industry in today's constantly changing and challenging environment. Decision and policy makers will be able to use the results of this study to assess the terrorism risk, compared to other risk based industries such as fire prevention and occupational health and safety. This comparison will enable these risk professionals to make effective decisions, which will contribute to the overall professionalism of the industry and in-turn benefit government, private and community based sectors.

1.6 The Purpose of the Study

The purpose of this study was to examine how recent terrorist attacks have affected the Australian public's security perceptions. Another aim of this study was to examine how the public's psychometric risk perception of terrorism contrasted with other known risks. Material for this study was sourced from government statistics, research papers, official trends from private sector surveys, various published academic material, university and internet databases. Using these data sources, a better understanding of the public's perception of Australia's terrorism threat in the present day was presented.

1.7 Research Questions

Terrorism is a sensitive subject that raises many interesting questions amongst many members of the public. However, due to the sensitive nature of the subject the research questionnaire will adhere to the strict boundaries of the university's ethical guidelines. With this in mind, the study addressed the following primary research questions:

- How have recent terrorist's events impacted on the Australian public?
- How does the public's psychometric risk perception of terrorism contrast with other known risks?

Following the response to the research questions, an assumption was made that needed to be resolved;

- Utilizing a 5-point Likert based questionnaire, establish the effectiveness of current Australian government anti-terrorism campaigns in the view of the Western Australian public.

1.8 Objectives of the Study

In order to adequately address the Research Question, the study will encompass a number of objectives:

- To examine how recent terrorist events have impacted on the Australian public.
- To examine the current public perceptions of terrorism compared to other public risks in an Australian context.
- Using a 5-point Likert based questionnaire, establish if current Australian government anti-terrorism campaigns are effective in the view of the Western Australian public.

1.9 The Study's Overview

According to Cohen et al (2000, p.73) "Research design is governed by the notion of 'fitness for purpose'... the purposes of the research design determine the methodology and design of the research". As a consequence, the study's design was planned according to a seven stage research procedure that was designed to collect, analyse and interpret data to ensure integrity, quality and reliability in both the research and the data results (Figure 1.1)

The Study's Overview

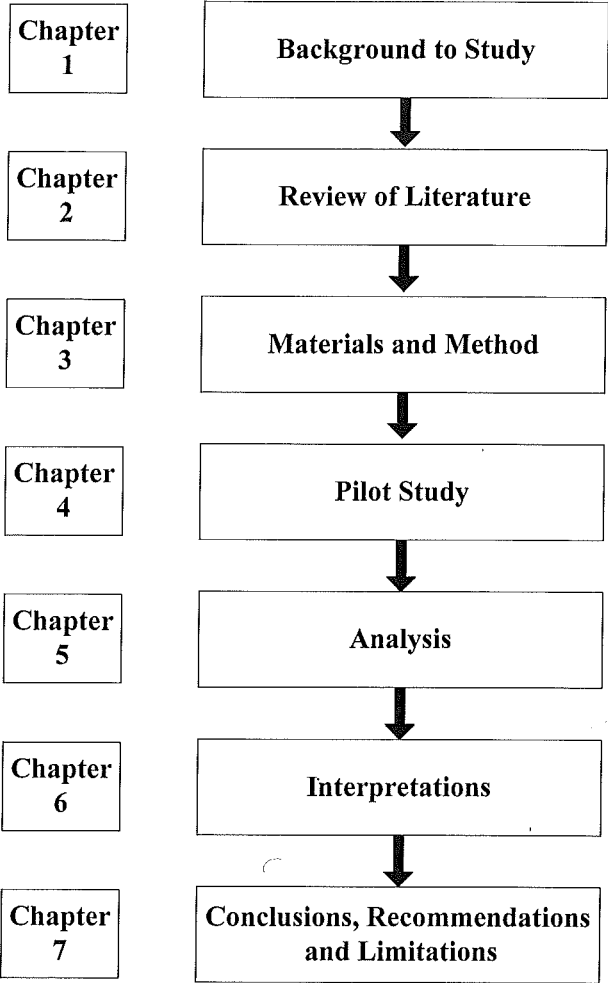


Figure 1.1
(Adapted from Singleton & Straits, 1999, p 92).

1.10 Conclusion

The chapter has presented the background to the 9/11 terrorist atrocity, the Bali bombing and home grown terrorism cumulated to produced a level of fear that was formally unknown amongst ordinary Australians. Due to public concern about the possible threat of a terrorist attack in Australia, the Federal Government launched the first of three national anti-terrorism public awareness campaigns. The three campaigns aimed to increase the public's awareness and response (via a federal government anti-terrorism hotline) to potential terrorism warning signs. Another aim of the campaigns was to increase the public's awareness for the need for a growing level of federal security measures that aimed to improve the anti-terrorism legislation in the current Commonwealth Criminal Code.

The study established that the need for all these security measures and legislation was verified through, a history of previous terrorist acts in Australia and overseas that resulted in fatalities, injuries and damage to Australian interests. The increase in Australia's profile on the world stage, due to its role in anti-terrorism initiatives regionally and internationally, have arguably brought Australia and its people to the notice of individual terrorists and terrorist organisations throughout the world. It was primary because of the lack of research into how the public perceptions of terrorism contrast with other known comparable risks that this study was undertaken. Another aim of the study was to examine how the events of 9/11 and other recent terrorist attacks, have affected the Australian public's security perceptions of a similar styled terrorist attack occurring within Australia.

Three study objectives addressed both the research questions and an assumption based question, this was achieved by using various academic, research and other professional risk based data. The study used a seven stage design that minimised errors to ensure the quality and veracity of all research data that was collected, analysed and interpreted. In this way mistakes, oversights, omissions and other errors were kept to a minimum, which thus helped to ensure the integrity of the study's reliability and validity results. Through using psychometric risk related research, the study believed that risk professionals and lay people alike will gain a greater understanding and appreciation into how people perceive risk. Policy makers, risk analysts, risk communications experts, decision-makers and other risk professionals, may then use this information to promote and implement effective health, safety and security reforms that will be of benefit to both industry and the general community as a whole. /

CHAPTER 2

REVIEW OF THE LITERATURE

2.1 Introduction

This chapter presents a detailed psychometrics overview (Sections 2.1 & 2.2), dating from 1879 to the present day, to establish a definition and the general history of psychometrics. The key studies are discussed, which have brought psychometrics from an experimental pseudo-science to a discipline used today by researchers in business, education and industry. Psychometric modern foundations (Section 2.3) examine research supporting the modern development of the psychometric paradigm. The origins and methodology of the psychometric paradigm of the study's theoretical framework (Section 2.4) was also investigated, as this framework demonstrates how social risk perception research has developed over time.

The aspects of risk perception (Section 2.5) and the Social Amplification of Risk Framework (SARF) (Section 2.6) are considered and the study examines why these are important facets in sociological research. A number of risk perception factors are discussed, including media attention, voluntariness and scale of an event based from a public perspective. Recent international and domestic research of public perceptions and terrorism (Section 2.7) is also examined, in order to gain an understanding of how the public perceives the risk of terrorism. Such research is important, as Slovic stated "public perceptions of risk have been found to determine the priorities and legislative agendas of regulatory bodies" (1997a, p. 22). Background to the research methodology (Section 2.8) is used to demonstrate the need for empirical research in testing the theoretical hypotheses to ensure the validity and reliability of the research. More specifically, the background to the study's validity and reliability tools are discussed in detail.

2.2 Psychometrics Background Overview

Psychometrics has often been a difficult concept to define, although a basic definition is a "theory or technique of mental measurement" (Encyclopaedia Britannica, 2007). Another definition is "any branch of psychology concerned with psychological measurements" (Dictionary.com, 2006). These definitions, however, are too vague to base a discussion on social risk perception. Ramsay (2001) offers perhaps the most useful description of psychometrics, defining it as a "branch of psychology that specialises in the science of statistics and measurement, specifically the quantitative psychological characteristics of human intelligence, personality or behaviour" (p.12416).

Wilhelm Maximilian Wundt (1832-1920) is thought by many (Brozek, 1984; Rieber and Robinson, 2001; Jansz and Van Drunen, 2003; Davidson and Sternberg, 2003) to be one of the founding fathers of modern psychology, developing it from being an experimental pseudo-science to a respected empirical science. His experiments revolved around the concept of introspection (observations), subject reaction times, historical and laboratory based physiological analysis and quantification of the higher order functions. In 1879 Wundt is credited with establishing the first anthropometric laboratory, being a co-founder of social psychology and writing the 'Principles of Physiological Psychology' in 1873 (Zalta, 2006).

Gustav Theodor Fechner's 1860 paper entitled 'Elements of Psycho-Physics' is arguably the foundation of modern psychology. Fechner was a German physicist who deliberated on psychological problems and was one of the first to investigate quantifiable relationships between the environment and a subject's senses. His experiments explored the effects of a subject's sensory response to physical stimuli such as light and heat at varying degrees of intensity. Fechner's experiments proved that a person's mind could be quantifiably measured and thus paved the way for psychology to become a respectable empirical science (Michell, 1999).

The study of psychometric characteristics of human intelligence, personality and behaviour can be traced back to Francis Galton's (1869) paper entitled: 'Hereditary Genius: An Inquiry into its Laws and Consequences'. Galton based his paper on Charles Darwin's laws of natural selection and argued that that an individual's intellect can be traced back through their heritage. According to Galton, people of eminence possess higher mental and physical abilities through better breeding, as compared to non-eminent people. However, Galton's study measured a person's intellect through weight, visual and auditory thresholds, which have little bearing on intelligence and lacked current scientific evidence. Although his theory was disproved, he was generally credited with developing the tools needed for psychological comparisons and measurements (Rust & Golombok, 1999).

By the late 1800s these views were starting to change, beginning with Karl Pearson's 1882 book entitled 'The Grammar of Science', this book focused on formal scientific studies underpinned by statistics and definable measurements of biological characteristics. Pearson is credited with founding modern statistics and his many works include the foundation of the normal curve, regression analysis, standard deviation and many correlation based theories (Williams et al, 2003).

James Cattell's 1890 study entitled 'Mental Tests and Measurements' began to convince the scientific establishment that psychological study was just as relevant to science as human anatomy or biology. Cattell's major contribution in the field of psychology was to establish quantitative, repeatable methodologies and techniques designed to measure human behaviour, intelligence and personality traits. In 1894 J. Allen Gilbert followed on from Cattell's study and examined the relationship between sensory perception, reaction time and intelligence; In particular, Gilbert measured how these could be attributed to improvement in academic grades, by using psycho-sensory tests and anthropometric measurement studies. This research formed the basis of modern day psychometrics (Rust & Golombok, 1999).

Stella Sharp (1898-1899) and Clark Wissler (1901) were two eminent scientists, who at the time disputed Cattell's findings and found that there was no correlation between mental tests and academic achievement by using physical or sensory-based assessments (Carver & Dubois, 1967). However, Charles Spearman argued in his 1904 paper entitled 'General Intelligence, Objectively Determined and Measured' that Sharp and Wissler's findings were inaccurate. According to Spearman the authors (in particular Sharp) had failed to take into account a precise quantitative expression of their findings. They also had failed to adjust for probable error and due to the lack of clear definitions; their study lacked both validity and reliability. (Spearman, 1904).

Spearman's own theory was that a single factor governed the intelligence of an individual, called the general intelligence factor (g) or positive manifold. His study found that if an individual performed well on one mental based cognitive test (e.g. a verbal test), there would be a high degree of likelihood that the same person would also perform well on another cognitive test (e.g. a mathematical test). Spearman believed this proved the correlation between sensory discrimination and intelligence quotients. In addition to this theory, Spearman is also credited with pioneering a statistical based technique called factor analysis, which is still widely used in modern psychometric studies today (Bartholomew, 2004).

By 1905 Alfred Binet and Théodore Simon had developed the first standardized psychometric based intelligence test known as the Binet-Simon scale. The scale used a series of psychological tests that were designed to test mental intellectual ability of both children and adults. Wilhelm Stern, a German psychologist developed and measured the first standardised IQ test for children in 1912. The test measured a person's intelligence by dividing the person's

mental age (obtained from the Binet-Simon test) by the person's chronological age, and multiplying the resulting figure by 100. This was a new phase in psychometrics; this was because for the first time a person's intellectual capacity could be measured accurately and indisputably in the eyes of science. Stern's method was the basis for intelligence testing that is still used today (Glover & Ronning 1987).

In 1916 Lewis Terman published a paper entitled 'The Measurement of Intelligence: An Explanation of and a Complete Guide for the Use of the Stanford Revision and Extension of the Binet-Simon Intelligence Scale'. In this manual Terman further developed the Binet-Simon scale, designing a more culturally suitable test for American adults and adding a dual vocabulary test (designed to test general intelligence). With the adoption of Stern's IQs model into the new test, the scale was named the Stanford-Binet Intelligence Scale, after Stanford University in America. This test became the standard for which all other IQ based tests are measured against (Becker 2003).

It was only a couple of years later, that the general public saw how psychometric testing, such as used in the Stanford-Binet Intelligence Scale, could affect the destiny of ordinary citizens. Robert Yerkes was an army major and psychologist who was given the task of leading a committee of forty psychologists to create a group intelligence test to process the large numbers of US Army and Navy recruits during World War One (Yerkes, 1918). In 1917, the Alpha test was created and was designed as a written multiple-choice test, which could be administered en mass and quickly marked with a scoring stencil.

The test was based on the Stanford-Binet Intelligence Scale and was objectively scored by a points system, which could then be divided into grades from A to D-. By using this grading system, recruits could be quickly classified into job-based roles according to their intelligence quotient (IQ). By November 1918, 1.7 million men had taken the test. At the end of the war, the results of these tests gave the discipline of psychology and psychometric testing in particular, credibility in the eyes of post war industry, business and education (Hakel, 1998).

Psychometrics and attitude measurement at this stage was further cemented as an empirical science during World War Two. One example of this is in 1941 when the United States War Department embarked on the largest single psychometric based program of the war. To achieve this end the war department enlisted John Flanagan, a distinguished psychologist at the time. Flanagan assembled a team of psychologists, officers, non commission officers and

civilians for the selection and classification of US Army and Air force pilots, navigators and bombardier applicants. Flanagan's team used the same psychometric techniques as Yerkes had done 24 years earlier, to aid in correlating various test scores to job based abilities (Sinharay & Radhakrishna 2006).

Louis Guttman was another war time researcher who made a significant contribution to the fields of intelligence, attitude and behavioural research. Arguably, his most significant contribution was when he was working at the United States Research Branch of the Information and Education Division, when along with Clyde Coombs he developed the Guttman scale in 1944. The scale was published in *Psychometrika* in 1944 under the title of 'General Theory and Methods for Matric Factoring'. More important to this research is that Guttman was one of the first researchers to further develop Charles Spearman's factor analysis methodology, into computational formulas for real world situations. Guttman is also credited with laying the foundations of scale analysis, reliability theory, and non-metric data analysis. His work was much admired by fellow psychometricians, practitioners and theoreticians alike (Shye, n.d).

After the Second World War psychology and psychometrics in particular received a new respectability. The military established real world uses for psychometrics and there was a perception among the general public and many psychologists, that the effective use of psychological studies had significantly contributed to the overall success of the war effort. Post war psychologists used their war time knowledge and expertise in efforts to reduce psychological, physical and mental risks to the general public (Kimble & Wertheimer, 2003). Psychometrics today is now established as a credible empirical science. Most employers today now recognise that aptitude assessments can be used to test a candidate's skills and abilities in order to predict the success or failure of a particular candidate in a certain occupation or project (Murphy and Davidshofer, 2001).

2.3 Psychometric Modern Foundations

Psychometrics as a science has infiltrated into the public domain and it is considered normal to undergo psychometric aptitude or intelligence testing to secure a job or health insurance. Psychometrics as a research tool was only just beginning and various scientist and researchers would further develop the medium. The research of public based risk perception was one of the first endeavours to use psychometric research (Bauer 1960; Slovic, 1962; Cox 1967a).

It was not until 1969 that the origins of the psychometric risk paradigm were developed with the investigation into the public's perception of risk, with Starr's (1969) published his paper entitled 'Social Benefit vs Technological Risk'. Starr sought to understand the science of statistics and measurement, specifically the quantitative psychological characteristics of human intelligence, personality and behaviour in relation to technological risks. Starr's research used historical data relating to accidental deaths arising from technological developments such as aircraft travel and atomic power. The study allowed a ratio of societal benefits versus human costs to be established in order to measure the social acceptance of a particular risk (Starr, 1969).

The earliest psychometric research conducted in heuristics and biases into the public perceptions of risk was carried out by Amos Nathan Tversky and Daniel Kahneman (1973). Their research centred on gamblers who were found to use heuristics to justify their gambling strategies. The research was significant because it established how people justify their exposure to risk (Tversky et al 1982). Heuristics are an informal judgement that a person will use to quickly gauge a level of acceptable risk. In the 1970's researchers focused on how the public perceived natural disasters (Slovic, Kunreuther & White, 1974; Kates, 1977; Fischhoff, Slovic & Lichtenstein 1977; Fischhoff, Slovic & Lichtenstein 1979). Their findings indicated that most people dismissed, downplayed or even totally ignored immediate threats to their wellbeing, such as cyclones and floods. This misplaced public risk perception spurred Slovic and his colleagues to investigate why people underestimated natural disaster threats even when given statistical and historical evidence to the contrary.

Slovic et al (1974) set out to understand how the human mind considers probability, uncertainty and risk in relation to natural disasters using Simons (1959) '*bounded rationality*' theory as his base. Bounded rationality theory asserts that due to human cognitive limitations such as emotional or irrational thoughts, humans are incapable of making objective decisions when dealing with today's complex world. Therefore, according to the '*bounded rationality theory*' most people reduce their environment to simple models to help in interacting with their surroundings.

Slovic and his colleagues argued that these human cognitive limitations were the main problem with how humans perceived risk (Slovic, Fischhoff & Lichtenstein, 1976) and in particular, how people downgrade risks. The authors argued that these cognitive limitations were apparent among natural disaster coordinators who, due to '*bounded rationality*', could not see alternatives when dealing with natural disasters. Slovic and his colleagues put the

cause down to a misperception of risk and a denial of uncertainty. The researchers found that too often people would put their faith in heuristics or the law of averages, as many people believed that if there was a bad flood this year there would be a reduce chance of flooding next year (Tversky & Kahneman, 1973). Their denial although irrational gave people hope. A large section of the community also put their trust in natural or man-made flood protection devices or in a belief that the flood was a freak of nature and would not occur again. Still others thought they would be protected from floods or by a higher power such as God/s or the federal government (Slovic, 2007).

It was not just natural disasters that people had risk based misgivings about, modern technologies such as medical x-rays and nuclear plants also caused a degree of concern among members of the general public. In particular researchers, found that risk aversion was related to qualitative risk characteristic profiles, such as how controllable the risk is or if a subject undertakes the risk voluntarily (Slovic, Fischhoff & Lichtenstein, 1979). The research was important as it raised many cognitive psychologists' understanding into the significance and merit of public based risk perception research, leading to the creation of the psychometric paradigm.

Fischhoff, Slovic, Lichtenstein, Reed and Combs (1978) are credited with developing the modern version of the psychometric paradigm in their seminal paper entitled 'How Safe is Safe Enough? A Psychometric Study of Attitudes towards Technological Risks and Benefit'. A set of nine different dimensions, such as voluntariness, were given and participants were asked to rate how risk averse they were to a number of different activities. These ratings were then means tested and inter-correlated for each activity or hazard in the nine dimensions. Factor analysis was then used to explain any variances in dread or novelty of the risk - later becoming known as familiarity or unknown - based risk rankings (Fischhoff et al, 1978; Slovic et al, 1980; Sjöberg, 2003).

2.4 Theoretical Framework: The Psychometric Paradigm

The origins of the psychometric risk paradigm can be traced back to Starr's (1969) paper entitled 'Social Benefit vs Technological Risk' Starr's paper focused on "establishing a quantative mechanism of benefit relative to cost...specifically for accidental deaths arising from technology developments in public use" (Starr 1969, p. 1232). The paper's research was founded on two main assumptions, that national historically based accident records were adequate to reveal trends in fatalities from the public's use of technology and that historically based social preferences and costs could be used to predict outcomes (Starr, 1969). However,

Slovic (1978) disputed these assumptions using *expressed preference*, a technique that examined the degrees of risks that subjects are willing to accept when undertaking a sport, activity or task. Slovic used this technique to highlight the following deficiencies of Starr's paper:

- The paper was based on current politically conservative values of the economic and social status quo's that "accepted risks are acceptable risks.
- It ignored fundamental distributional questions about who assumes which risk/s.
- There were deficiencies in determining what benefits or detriments there are for owning a particular risk/s.
- There was limited research about people's rationality and decision making in the market place.
- Starr's assumptions were based on people's access and their willingness to use information.
- From a technical viewpoint, there were discrepancies in implementing Starr's social benefit vs cost model.

It was these concerns and the difficulties associated with social risk data collection that prompted Slovic (1987) to conduct an analogous study focusing on questionnaires asking "people directly about their perceptions of risks and benefits and their expressed preferences for various kinds of risk/benefit tradeoffs" (Slovic, 1992, p. 118). Slovic believed this approach produced a current rather than historical public perception of risk and examined other aspects of risk besides fatalities and financial costs. Due to the large amounts of data collected, a range of statistical analysis methods could be used to draw conclusions. The depth and breadth of Slovic's study meant that public hazards could now be rated and prioritised according to their characteristics such as voluntariness of exposure, controllability, consequences, familiarity and dread. These characteristics are recognized as the main elements that influence risk perception and acceptance (Starr, 1969; Slovic, 1992).

Slovic (1992, p.119) asserts that "the distinguishing feature of our studies has been the use of a variety of psychometric scaling methods [such as multivariate analysis techniques] to produce quantitative measures of perceived risk, perceived benefit and other aspects of perceptions (e.g., estimated fatalities resulting from an activity)". This research was achieved through the mapping of public risk perceptions and attitudes towards 81 everyday and unknown risks. Slovic (1986; 1987) called this new method of measurement the psychometric risk paradigm. (See Figure 2.1).

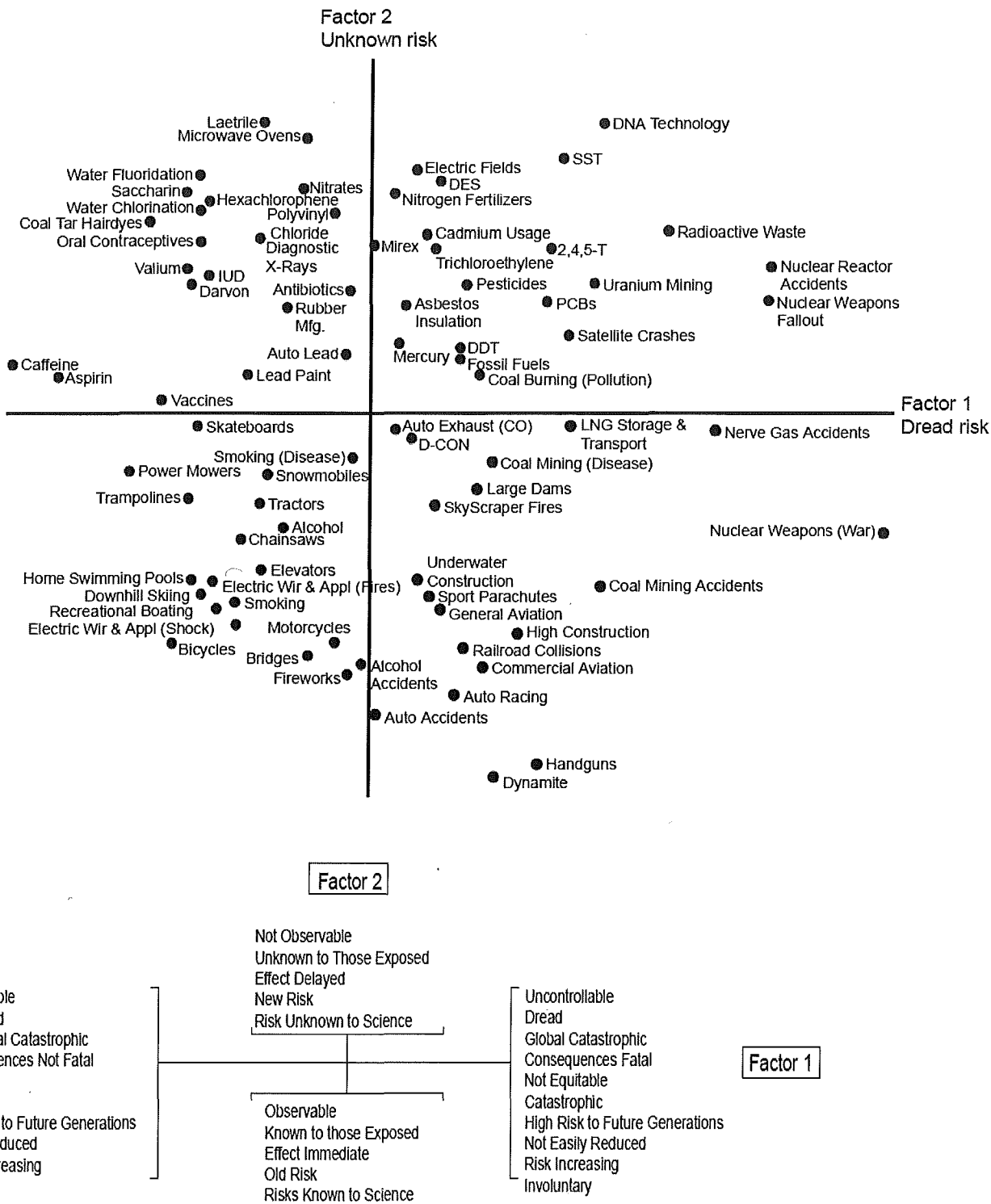


Figure 2.1 Psychometric risk paradigm: Location and Risk Characteristics of 81 Risk Based Hazards (Slovic 1987, p.282).

The psychometric paradigm is essentially a '*cognitive map*' of social risk perception, which is broken down into two axis of Dread Risk (Factor 1) and Familiar Risk (Factor 2). Dread risk is a gradation of measurement along the horizontal axis, which "reflects the degree to which a risk is understood and the degree to which it evokes a feeling of dread" (Slovic, 1992, p.121). Therefore, risks further to the right of the scale have a higher degree of dread than those to the left of the scale. For example, the map indicates that smoking cigarettes has a lower dread risk in society than the risk/s of nuclear weapons.

Familiar risks are represented along the vertical axis of the psychometric risk paradigm and indicate the public's knowledge or familiarity with these risks. Therefore familiar risks such as motorcycle riding and elevators are found on the lower part of the axis and as a result garners a lower societal risk perception. Whereas unfamiliar risks, such as lead paint and medical x-rays, appear higher up the axis, which demonstrates that the general public perceive these activities or technologies as posing a higher degree of risk to their health and safety (Slovic, 1997, p 235). By combining dread and unknown or familiar based risk characteristics, the public's risk perception of hazards may be mapped. An example is bicycles, which has a familiar and low dread rating with the general public, whereas radioactive waste is considered an unfamiliar risk, with a high dread based factor rating. This type of information can be used by policy makers to ensure high dread-based risks carry increased legislation requirements and safety controls to reduce the public's potential to exposure.

Slovic (1992, p.120) sums up the psychometric risk paradigm as:

"A theoretical framework that assumes that risk is subjectively defined by individuals who may be influenced by a wide array of psychological, social, institutional, and cultural factors. The paradigm assumes that, with the appropriate design of survey instruments, many of these factors and their interrelationships can be quantified and modelled in order to illuminate the responses of individuals and their societies to the hazards that confront them."

2.5 Risk Perception

If the perception of risk is the basis for "the quantitative psychological characteristics of human intelligence, personality [and} or behaviour" (Ramsay 2001, p.12416) then the science of psychometrics is its measure. According to Slovic (1987, p.281) "Psychological research on risk perception originated in empirical studies of probability assessment, utility assessment,

and decision-making processes". The science of heuristics was an important finding of this process. The field of heuristics allowed scientists to demystify some of the behavioural responses of participants when placed in certain situational circumstances. Heuristics however are often fraught with research inconsistencies, and although heuristics can be used as a general rule of thumb to make risk based judgements quickly and effectively they were not used in this study. According to Slovic (1987, p 281) these inconsistencies include:

"Large and persistent biases, with serious implications for risk assessment. In particular, laboratory research on basic perceptions and cognitions has shown that difficulties in understanding probabilistic processes, biased media coverage, misleading personal experiences, and the anxieties generated by life's gambles cause uncertainty to be denied, risks to be misjudged (sometimes overestimated and sometimes underestimated), and judgments of fact to be held with unwarranted confidence. Experts' judgments appear to be prone to many of the same biases as those of the general public, particularly when experts are forced to go beyond the limits of available data and rely on intuition".

As with heuristics, the perception of risk influences a person's behaviour and their decision-making ability. However, risk perception is not easy to define as it is composed of multiple, complex and inter-related aspects including "cognitive, personal, situational and contextual factors" (Sjoberg cited in Plapp & Werner, 2006, p.1). These factors singularly or combined will all have varying degrees of bearing upon an individual's risk perception and their behaviour towards a particular risk. "Risk perception is all about thoughts, beliefs and constructs" (Sjoberg 2000b, p.408). Therefore risk perception is a very personal and subjective process which is often determined by an intuitive individual or collective risk judgments, based on previous knowledge and experience or by external factors such as the media. Chilton et al (2002, p.216) expanded these factors and noted that from a public perspective, risk perception is viewed using a number of constructs (Table 2.1).

Constructs	Definitions
Scale	The number of people killed in a single event.
Personal Control	How much personal control people have over the risk.
Voluntariness	How much choice people have over being exposed to the risk.
Media-Attention	How much media attention the risk receives.
Expert-knowledge	How much experts know about the risks.
Uneasiness (Dread)	How uneasy people feel about the risks.
Number per year	Number of deaths per year resulting from each of the risks.
Age-Groups Affected	The ages of people affected.
Household Benefit	The benefits of safety programs to the respondents and their households.

Table 2.1 Modern Constructs and Definitions of Public Risk Perception (Chilton et al, 2002, p 216).

Weinstein (cited in Sjoberg et al, 2004, p.8) further added to this view by stating that the perception of risk in most cases goes beyond the individual and is influenced by “social and cultural constructs reflecting values, symbols, history, and ideology.”

2.6 Social Amplification of Risk Framework (SARF)

The theoretical foundations for the development of the Social Amplification of Risk Framework can be found in five key principal papers; (Renn, 1991; Kasperson, 1992; Burns et al, 1993; Kasperson, Renn, Slovic et al, 1998; Kasperson & Kasperson, 1996). According to Kasperson et al, (2003) the model was developed to overcome the fragmented research from a wide range of studies in various risk perception and communication fields including organisational responses to risk and media influences on cultural and psychometric fields of study. The framework (Figure 2.2) also can analyse “dynamic social processes underling risk perception and response” (Kasperson et al, 2003, p.13).

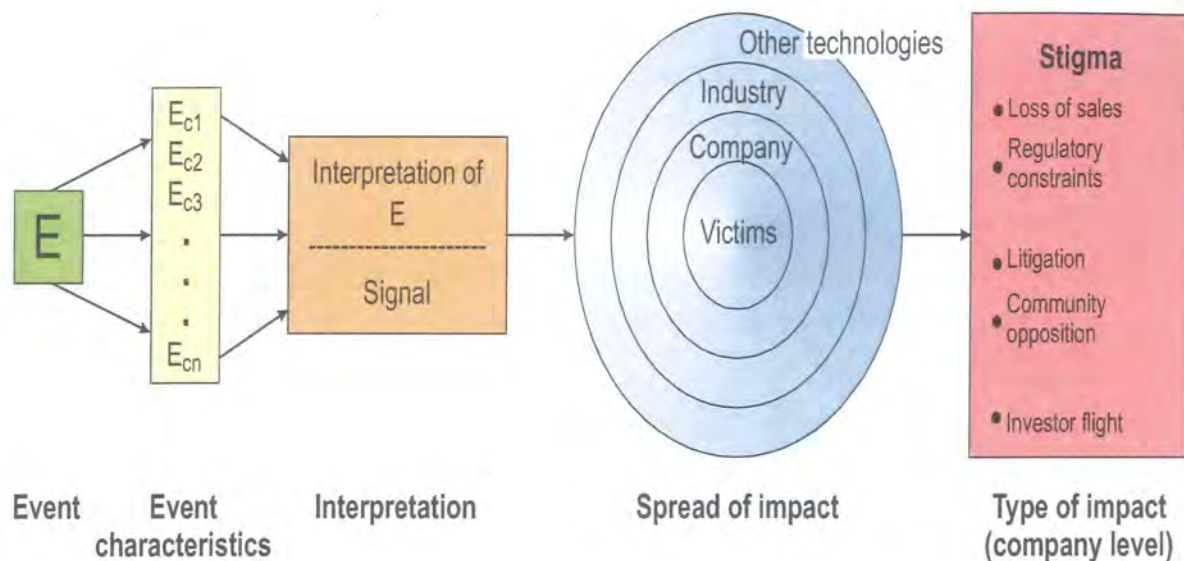


Figure 2.2 The Social Amplification of Risk Framework Model (Kasperson et al, 1998, p.182)

A key feature of the SARF model is the relationship between risks, risk events, hazards and how these impact on an individual, group or society. “Events pertaining to hazards interact with psychological, social, institutional and cultural processes in ways that can amplify or attenuate public perceptions of risk and shape risk behaviour. Behavioural patterns in turn generate secondary social or economic consequences” (Renn et al 1992, pp.139-140). An understanding of the SARF model is important as “the perception of risk forms the basis of the decision making process. An individual will make a judgement about a risk or hazard from their unique perspective based on their personal knowledge of the risk, previous experience or recently learned information. Based this intuitive judgement, the individual may then decide how to control or mitigate a risk” (Sargent & Brooks, 2007)

Although risk perception is influenced by the SARF model, the SARF model was not used in this study. Furthermore external influences such as world, regional and national politics, current affairs and the media will also influence the participant’s perspective and thus response about the issue of terrorism on any given day. The SARF model offers a greater understanding of how risk is perceived, amplified and /or attenuated in real world situations; however it is but one aspect of this understanding.

2.7 Public Perceptions and Terrorism

Analysis of the public perceptions of risk can be traced back to the 1960's (Bauer 1960, Slovic, 1962). The risk of terrorism is also not a new phenomenon and various groups throughout history have used violence or the threat of violence to gain political, ideological or religious gains. In modern times it can be argued that terrorism came to world attention through the 11th September 2001 attacks on the World Trade Centre and the Pentagon. Never before has such an atrocity highlighted the vulnerability of ordinary members of the general public. This is important to note as Slovic states that the "public perceptions of risk have been found to determine the priorities and legislative agendas of regulatory bodies" (Slovic, 1997a, p.22).

The aftermath of these attacks gave important insights into how people perceived, evaluated and responded to risk. In an effort to prevent any similar attack, governments around the world hastily introduced a raft of new anti-terrorism legislation, border security controls, anti-terrorism treaties, public awareness campaigns and immigration restrictions (Attorney Generals Department, 2007). It could be argued that some of these measures, such as taking one's shoes off at airport security or manicure scissors being confiscated were an over-reaction to the level of threat posed. However these measures were designed to both protect and reassure the public in a heightened time of stress. As has been discussed, the public's perception of risk plays a critical role in their behaviour and response to real or perceived threats, and it is for this reason that public perception plays such a large role in social research (Slovic & Weber, 2002; Jenkin, 2006).

Human perception of risk is very complex and cannot be viewed in a vacuum. Cousins and Brunt (2002), in particular illustrated this in their paper entitled 'Terrorism, Tourism and the Media'. The authors used keyword searches in four different national newspapers and one trade magazine to illustrate how the media used sensationalist methods (emotive, judgemental and descriptive words) when reporting on terrorism involving tourists. Although undoubtedly these methods were used to sell more newspapers, it was the style and duration of these reports that lead to the public's perception of their security being reduced and their levels of fear being heightened over time. This may have accounted for the decline of tourists travelling to Israel, Sri Lanka and Egypt in 1997 (Cousins & Brunt, 2002; Slovic, 2002; Howie, 2005).

Sjöberg (2004), conducted research into the public perceptions of terrorism among 294 Swedish participants in a paper entitled 'The Perceived Risk of Terrorism'. Using the Psychometric risk model dimensions of dread and new risk characteristics were measured. It

was found that the new risk factors in relation to terrorism had no significant bearing on perceived risk; however, the dread based factor remained high. Terrorism, in comparison to personal or criminal risk, received a high risk level rating. Among participants there was also a positive perceived belief in the competence of terrorist's organisations' capacity to carry out threats. Many of the participants also held strong views that terrorists were confused or misinformed about events in the modern world. Correlations of perceived terrorism risks proved strong, with similar hazards over time. Women, people with low levels of education and older participants also gave larger risk ratings than males within the study, however it was noted that these gender based results were often inconclusive which may affect overall gender specific findings (Sjöberg, 2004).

Investigation into similar Australian studies into public perceptions of terrorism yielded little results. One study by Howie (2005) entitled 'There is nothing to fear but fear itself (and terrorists): Public perception, terrorism and the workplace' was based on a survey of the public perceptions to the threat of terrorism in Melbourne's central business district. Significantly the author argued that Australians did not perceive terrorism in the same way as other countries that have recently experienced a recent attack. Interestingly this facet of Howie's research was also apparent in the study as when participants were asked to take part, many thought that the issue of terrorism was something that didn't occur within Australia, but was instead something which occurred 'over there'. According to Howie it is the media's sensationalisation of the Bali, Madrid and London bombings which has led to widespread discrimination within the Australian community. Howie believed that this has resulted in significant cultural change which has led to increases in occupational stress, intolerance, irrationality and hyper dread in the general community (Howie, 2005). As was noted earlier, the media is but one aspect an individual uses to form a credible perception of risk. It is seen in Howie's research, however that the media's sensationalisation of terrorism may have some quite significant and undesirable public risks/consequences.

Aly et al (2007) conducted a study entitled 'Behavioural Responses to the Terrorism Threat: Applications of the Metric of Fear.' The study focused on developing a fear scale, which was derived from Gordon and Riger's (1979) fear of rape scale. The scale was used to gauge the perceived safety of Australian Muslims, as compared to the broader community, based on media and political discourses on terrorism. Significantly they found that post 11th September 2001 participants experienced both heightened levels of fear and thus changed their behavioural patterns such as avoiding public transport because of this increased level of risk

perception. Aly et al believed that one reason for these heightened levels of fear was a perception among members of the Muslim community that they were both viewed and portrayed in a negative light in the popular media. The researchers also found that like most fear of crime surveys, there were notable differences in feelings of fear among people of different gender, social class and educational backgrounds (Aly et al, 2007).

2.8 Research Methodology: The Search for Truth

The basis of science is to understand the world in which we live in. Humans have always been fascinated to comprehend the mysteries of both our natural and man-made world, not only the present but also in a historical context. Mouly (cited in Cohen et al 2000) asserts that there are three means that people use to understand the world around them; *experience, reasoning and research*. Arguably, the most important of these is research, because gains in empirical knowledge cannot be attained without reliable, repeatable, and valid research. However each category is complementary to the other and will inevitably overlap; therefore, they should not be viewed separately during the study (Cohen et al, 2000).

McNeil and Chapman (2005) expand on Mouly's views and discussed the reason behind the decision to embark on empirical research. They assert that a theoretical, abstract or analytical understanding of the world around us is the basis for empirical research, because all theories need to be tested in real world environments and adhere to a recognised standard of scientific testing, encompassing validity and reliability.

2.8.1 Validity

According to the Cambridge English Dictionary (2007), validity is "based on truth or reason", similar to the Merriam-Webster Online Dictionary (2007) who defines validity as being "well-grounded or justifiable: being at once relevant and meaningful". The Oxford English Dictionary (1989) provides perhaps the most detailed definition; describing validity as "a [scientific] quality that is well-founded on fact, or established on sound [scientific] principles, and thoroughly applicable to the case or circumstances; soundness and strength (of argument, proof, authority, etc.)"

Validity, therefore, is a scientific methodology that is used to test the degree of accuracy of results or measurements obtained in a research project (Daymon & Holloway 2002; Cohen et al 2000; Thietart et al 1999). According to Schwab (2005) the aim of research validity is to establish a baseline for accurate and relevant research that answers the research question/s posed by the study. Therefore, a validity-based methodology allows scientific evaluation of

the research plan, design, methodology and instruments used within the study. By producing research that is valid, the wider scientific community is more likely to accept the findings of the study.

Kumar (2005) believes there are two approaches to establishing the validity of a research instrument; logic and statistical evidence. Ensuring validity through a logical link requires the objectives of the study to justify the research question posed. This type of validation method is known as face validity and is based on the judgement that an instrument is measuring what it purports to measure (Thyer 2001). On the other hand, statistical evidence is “based on the extent to which statements or questions represent the issue they are supposed to measure, as judged by the researcher and experts in the field” (Kumar, 1996, pp.138,139). This type of validation is known as content validity, which determines “whether or not your instrument reflects the content you are trying to measure” (Colosi 1997). Face and content validity were important considerations for the study as a valid research instrument is needed to answer the study’s objectives and was achieved by consultation with security experts.

2.8.2 Reliability

The reliability of a testing instrument is imperative to the accuracy and value of the results obtained from its use. An incorrect instrument may not only produce questionable results, but may also throw the credibility of the entire report into question from the wider scientific community. Merick (cited in Kopala & Suzuki 1999, p.26) stated that “traditionally reliability is described as the extent to which a research endeavour and [its] findings can be replicated.” Thorndike (1997, p.96) expands on this by referring “to the accuracy and precision of a measurements procedure”. Aiken and Groth-Marnet (2006, p.p.87, 88) noted that consistency, predictability and stability are important aspects of a reliable test instrument.

Although the above definitions all have merit, the reliability of any empirically based testing instrument inevitably involves chance errors where the researcher inaccurately inputs, calculates, measures or misreads the data presented. These errors can be for a number of reasons including stress, fatigue or distraction. Although all researchers aim to achieve error free measurement, the actual realities of scientific measurement may be quite different to the researcher’s intentions (Carmines and Zeller, 1979). In order to ensure reliability and consistency the study used three reliability mechanisms namely: Equivalence forms reliability measurement, Cronbach’s co-efficient alpha test and Expert peer review.

2.8.3 Equivalence Forms Reliability Measurement

This method uses the results of comparable studies to validate the reliability of instruments or survey in the study. Equivalence measurement works on the assumption that if the current study's instrument (survey) yields similar results to previous comparable studies, then the study's research instrument can be said to be reliable (Cohen et al 2000, p 118). This study used Slovic's (1987) paper to gain equivalence reliability, Slovic's paper was suitable for equivalence reliability measurement because the study utilised the psychometric paradigm to quantitatively measure the public's perceptions of social risk, using psychometric based techniques. The subject matter was also similar, as they are both relatively new phenomenon affecting Australian society and are issues that need to be considered by authorities to ensure the public's safety and security.

2.8.4 Cronbach's Co-efficient Alpha Test

In psychological and sociological research, Cronbach's co-efficient alpha is an important tool for measuring the reliability of psychometric instruments such as Likert scale tests. Cronbach's co-efficient alpha is a mathematical reliability tool that is based on the concept of variance (correlation values). Each component in a survey has its own unique calculable variance number, which combined with other components gives a total variance number. The role of the Cronbach co-efficient alpha test (Figure 2.3) is to compare the sum of each test or variance against the total calculated variance (Litwin, 1995, p.24).

$$\alpha = \frac{N \cdot \bar{r}}{(1 + (N - 1) \cdot \bar{r})}$$

Where: N = number of items in a scale

r = is the average of all (Pearson) correlation coefficients between each of the study's components

Figure 2.3 Cronbach's Co-efficient Alpha Formula

Cronbach's co-efficient alpha measures the proportion of variance in a set of test scores between the ranges of 0.0 to 1.0. The higher the value indicates a greater reliability estimate (internal consistency) in the testing instrument. An instrument that receives a Cronbach alpha score of .80 indicates that the testing instrument is 80% reliable and 20% unreliable. "As general rule of thumb coefficient alpha (α) should be .80 or higher to be considered reasonably reliable" (Maxim, 1999, p. 244). Standard deviation is another method that was used to ensure

the reliability of the study. The study used the same control points as in Slovic's (1987) study, therefore; if the psychometric based control calculations in this study match Slovic's controls then the calculations can be deemed reliable. By extension, the experimental points measured would also be both reliable and valid.

2.8.5 Expert Peer Review

A number of experts evaluated the study with proficiency and knowledge in the academic field of security science. This ensured that mistakes or inconsistencies with the data or results would be found and corrected as the study progressed. The lengthy procedural process of a scientific peer review also helped to ensure the study's data and results were both consistent and reliable (Rowland, n.d).

2.9 Conclusion

The chapter presented a detailed psychometrics background overview (Sections 2.1 & 2.2). The study also examined the definition and general history of psychometrics, including the principled founders, their key research concepts and their foundation studies. Key to this discussion was why psychometric based research is so important today in business, education and research institutions. In addition in psychometric modern foundations (Section 2.3) critical analysis issues between psychometric paradigm developers Slovic and Starr were also discussed in detail. The theoretical framework of the psychometric paradigm (Section 2.4) was also evaluated; in particular, demonstrating how the psychometric paradigm model can be applied to public risk perception based research.

Risk perception (Section 2.5) was illustrated to demonstrate how a person's behaviour and their decision-making abilities are affected by personal or community based biases. The Social Amplification of Risk Framework Model (SARF) (Section 2.6) was demonstrated to show how an individual's perception can be amplified or attenuated due to the influence of external factors such as current events or the media. As this proved to be an unreliable model in social risk perception research, the SARF model was used in this study.

Insights into public perceptions and terrorism (Section 2.7) were discussed to gauge how the public perceived, evaluated and responded to risk. It was these public risk perceptions that instigated various federal government post 9/11 anti-terrorism initiatives, these included: new anti-terrorism based legislation, upgraded border security protection measures, enhanced immigration controls and the emergence of public awareness anti-terrorism campaigns (Slovic

& Weber, 2002; Jenkin, 2006). The research methodology (Section 2.8) concluded the chapter and provided details of the background to the study's reliability and validity tools.

CHAPTER 3

MATERIALS AND METHODS

3.1 Introduction

This chapter presents the materials and methods used in the study with an emphasis on its purpose, definition, design and limitations. Key study objectives (Section 3.2) are included to give the reader an understanding of the design principles used to resolve the project's primary problems. Key to these design principles are the study design (Section 3.3), which includes the problem definition (Section 3.3.1) and the research instrument (Section 3.3.2), target sampling methodology (Section 3.3.3), data collection methodology (Section 3.3.4), data processing requirements (Section 3.3.5) and the data analysis and interpretation requirements of the study (Section 3.3.6). Complementing the elements of the study's design are the study's controls (Section 3.4 & 3.5) and the study's reliability and validity methodology (Section 3.6). Ethical considerations (Section 3.7) are discussed to ensure participants knew their rights through the process of informed consent (Section 3.7.1). Finally research merit and integrity was examined (Section 3.7.2).

3.2 Key Study Objectives

"Empiricism is a philosophical term to describe the epistemological theory that regards experience as the foundation or source of knowledge" (Aspin 1995, p.21). Experience and thus knowledge about our planet cannot be gained without the use of our senses. The word empirical is based on direct experience or observation of the world through sense-based research (Punch, 2000). The aim of the study was to gain a level of understanding of how recent terrorist based attacks have impacted on the Australian public's perception of risk. A key consideration in responding to this understanding was recording participants keen observation of the world around them in the form of a Likert scale based survey.

Specifically, the study focused on the impact of a long-term anti-terrorism campaign on the general public and examined the social and security repercussions of the 9/11 attack as well as other more recent terrorist attacks affecting Australia. An understanding of these issues was sought through a literature review, other researchers' knowledge within this field and the study's own Likert based research survey of the general public. In social research, it is critical to obtain a clear understanding on the definition of widely used terms. One such example is the difference between the terms of a terrorist act and a terrorist incident. Among other

sources, the media uses these terms interchangeably, which may ultimately confuse or cloud the judgement of an issue or situation. Terrorism has many facets and guises and as such has as many definitions. The study was based on the Australian Federal Government's Criminal Code definition of terrorism. The following definition sums up the spirit of what terrorism actually is and more importantly, who in society terrorist based acts or incidents affect.

A 'terrorist act' is defined under Australian law as an act or threat, intended to advance a political, ideological or religious cause by coercing or intimidating an Australian or foreign government or the public, by causing serious harm to people or property, creating a serious risk to the health and safety to the public, or by seriously disrupting trade, critical infrastructure or electronic systems. Whereas a 'terrorist incident' however is "a combination of circumstances or conditions which may lead to or result from a terrorist act, and which require preventative and/or responsive action (Commonwealth Criminal Code Act 1995, pp.119-120).

3.3 The Study's Overview

The study's overview is governed by the notion of 'fitness for purpose' (Cohen et al 2000). To this end, the study's overview was planned according to a seven stage research procedure (Figure 1.1). The study's overview was designed to collect, analyse and interpret data, while maintaining the highest standards of integrity, quality and reliability in both the study's research and data results.

3.3.1 Problem Definition

Since Australia's invocation of the ANZUS treaty on 14th September 2001, Australia has been a willing participant in the American led 'war on terror', including undertaking military operations in Iraq and Afghanistan. Arguably, Australia's vocal and military support of the American led coalition has brought new dangers to Australia and the Australian public. In particular, the Australian loss of lives in the Bali bombings that occurred on 12th October 2002 and 1st October 2005 were Australia's equivalent of the 11th September 2001 attack in regard to its exposure to terrorism. Since the 11th September 2001 attack, the Australian Government has embarked on a national campaign to strengthen Australia's borders, overseas and national infrastructure and the protection of its people. The outcome of these events has been a change in the Australian security landscape and the way in which Australians live their lives (Attorney Generals Department, 2007). The study was primarily undertaken because there is a lack of current Australian research into public psychometric risk perception of terrorism.

3.3.2 Likert Scale and Survey Design

A 5-point Likert scale response survey was devised to measure the public's psychometric risk perceptions of terrorism. The measurement of the public's attitude was central to this study, so a highly reliable qualitative test instrument was needed. Such an instrument was the Likert survey, also known as an ordinal or ranking scale. In 1932 an American educator and psychologist named Rensis Likert developed a new approach in the measurement of attitudes. The Likert scale as it became known was originally conceived in 1929 by Gardner Murphy but was further developed by Likert in his 1932 paper entitled 'A Technique for the Measurement of Attitudes' (Likert, 1932, p.p.1, 2). Likert developed his scale after trying several different scaling methodologies including Thurston's scaling methodology, but found neither of these scaling methodologies could be applied to attitude measurement in a quantifiable scientific manner, so he set out to build his own (Uebersax, 2006).

Likert was also one of the founders of studies involving attitude, perception and risk and from 1935 to 1937 Likert was the director for the Life Insurance Agency Management Association. During World War Two he chaired the Division of Programmed Surveys which investigates morale via Likert based opinion polls and later became the director in charge of morale for the now famous U.S. Strategic Bombing Survey from 1944 to 1946 (Anesi, 1997; World of Sociology, 2006). Likert was a proponent in surveying domestic attitudes and opinions in order "to determine the underlying attitudes of their subject's rather than general shifts in expressed opinion" (Capshew, 1999, p.121). These true attitudes can then be used to shape the decision making process.

According to Babbie (2005) The Likert scales purpose is "to improve the levels of [scientific] measurement in social research through the use of standardised research categories in survey questionnaires to determine the relative intensity between different items" (p.174). According to Kumar (2005) The Likert scale is a uni-dimensional summative rating survey scale which measures each statement in the questionnaire with the same weight or attitudinal importance. Participants are asked to rate their attitude on a particular issue using the response categories of Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D) or Strongly Disagree (SD). The categories are then graded using a number system usually from 1 to 5.

These scores are then reverse coded to maintain the survey's integrity and are calculated to gain an average index score rating for each of the survey's statements. At this stage it important to note that attitude scales measure the intensity of a participant's view towards a particular issue, not necessarily their attitude towards that issue. However Likert scales are a

good measure of one participant’s viewpoint towards one issue as compared to another (Kumar, 2005, p.p.145, 146).

According to Jupp 2006 “Likert attitudinal scales are a useful technique [in social science research], since it is possible to make a research tool that is very attractive to participants, and they can therefore become much more likely to be completed, improving response rates and generalization reliability” (p.161). Cohen et al (2000) further adds that Likert scales are “widely used in research, and rightly so, for they combine the opportunity for a flexible response with the ability to determine frequencies, correlations and other forms of quantitative analysis... they afford the researcher the freedom to fuse measurement with opinion, quantity and quality” (p.253). It is for these primary reasons that this type of scale was used for this study (For more information on Likert scales please see Section 4.7.4 Likert Surveys).

The aim of a Likert survey is therefore to assess and measure “the strength or intensity of [a] respondent’s feelings or attitude toward a particular issue” (Singleton & Straits 1999, p.288). Likert scales usually function by requiring participants to respond to a series of questions within the survey, based on an assumption that each question within the survey has an “equal attitude value, importance or weight in terms of reflecting an attitude towards the issue in question” (Kumar, 1996, p.129). Likert scale questions are presented to participants in a summative rating scale (Figure 3.1) asking respondents to express their attitude towards a particular issue by ticking the appropriate box on the scale. These opinions range from strongly agree, agree, neutral, disagree or strongly disagree with the statement asked. Each response is assigned a numerical rating from 5-1 (positively framed), with 5 representing strongly disagree and 1 representing strongly agree. In this way, each statement can be calculated to produce a rank, sum or average of the respondent’s attitudes toward a particular issue (Nachmias & Nachmias, 2000)

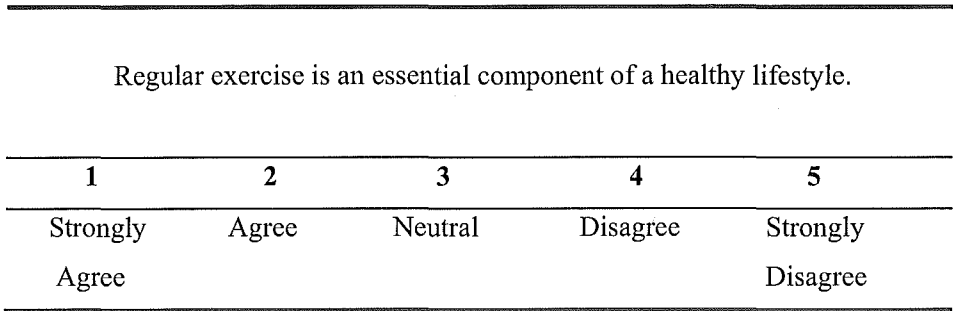


Figure 3.1 Likert Scale Example (American Statistical Association, n.d)

In order to reduce an acquiescent response (a respondent's tendency to answering yes or neutral or a positive response to every question), Thorndike (1997) proposed that the wording of one-half of the survey should be reversed (negatively phrased); meaning a respondent's agreement to the statement will indicate that the respondent *does not* have the characteristic being measured. The reversed or negatively framed statements are then positively scored so that the sum or average of each statement can be calculated (Stangor, 1998). In negatively frame statements a numerical rating of 1-5 is assigned where 1 represents strongly disagree and 5 represents strongly agree.

Likert scales do have some limitations. The reliability of truthful responses cannot be verified and the uni-dimensional nature of a Likert scale poses problems, because only one issue at a time can be measured. Human nature also plays a part in Likert scaling limitations; as most people are unwilling to mark extremes and therefore responses such as strongly agree and strongly disagree may not be ticked, even though a person may feel very strongly about a particular issue (Koulikov, 2003; Mullen, 1995). Alternatively, people may also tick neutral positions to avoid responding to topical or sensitive issues. Most Likert scale surveys only allow for a fixed response and therefore a participant does not have the opportunity to express their feelings on a particular issue. However, key data and information can be acquired that may enhance the quantative side of the study. Finally, interpretation of the data's results must be viewed carefully, especially when calculating positive and negative based statements, as it is this stage where most errors will likely occur (Cohen et al 2000).

Nevertheless, the benefits of Likert scales tend to outweigh their limitations, particularly for this type of application. The scale is simple to construct and easy to use for both the participant and researcher. Around the world there have been countless studies involving the measurement of attitude, perception and risk on a variety of psychometric based topics using Rensis Likert Scaling methodology as their base. The methodology also provides the reliability, validity and sensitivity required to investigate complex social research based problems (Cohen et al, 2000, p 253). Finally Likert scales are time tested and considered reliable research instruments by social researchers worldwide (Aiken & Groth-Marnet 2006).

3.3.3 Target Sampling

The study sampling design was based on probability sampling methodology. This technique selects people by day and night at random from the wider population to participate in the survey. The model was chosen as it contains less risk from bias to the selection of cases from the researcher. In addition, the laws of mathematical probability can be applied to ensure the accuracy of the sample is maintained (Thyer, 2001; Dooley, 2001; Cohen et al 2000; Singleton & Straits 1999). Both the pilot study and the main study were conducted by surveying people waiting at taxi or bus ranks. The reasoning behind this approach was that people who are waiting for a bus or taxi might appreciate passing some time by filling in the survey. The researcher did not enter nor conduct the survey inside the shopping centres due to the complexities of gaining permission from centre managers and the general lack of time customers had to spare.

The pilot study's target population consisted of members of the general community over the age of 18 years old. Thirty people who visited "Lakeside Joondalup Shopping City" in the latter half of 2007 were asked to complete the survey. The sample size of 30 was chosen because this is the minimum number needed for accurate statistical analysis (Cohen et al 2000; Dixon 1987 (cited in Walliman, 2006, p.80)). The main study involved 340 people and was carried out at the "Centro Warwick Shopping Centre". Commercial venues were chosen as they can accommodate large numbers of the general public, an approach that ensured randomness of the survey and access to the wider community. In addition, both sexes from all nationalities and social classes frequent these shopping districts regularly on any given day.

3.3.4 Data Collection

Research material for the study was sourced from government and university databases, research papers, various academically based books and journals, the internet, a literature review and a Likert scale based research survey. Based on these sources and within the context of the study, a baseline for gauging the public's perception of Australia's terrorism threat in the present was established.

A key consideration in sourcing data for social research is to take into account aspects of the type, quality and reliability of the information needed to complete the research study. Another important facet to consider is the method and the type of analysis needed to utilise the data under consideration (Kumar, 1996, p 105). Social research data collection is generally

recognised as being classified into two main groups; primary source data and secondary source data (Walliman, 2006; Cohen et al 2000). Primary source data are “eyewitness accounts of the events described, whereas secondary sources consist of indirect evidence obtained from primary sources” (Singleton & Straits 1999, p 380).

Primary source data collection for the study was achieved through the conduct of a survey into the public’s views, attitudes and beliefs about their perception of the risks relating to five specific activities and technologies. The secondary source data collection for the study was conducted by using research material sourced from a wide variety of academic research which included numerous journals, conference papers, dissertations, thesis’s and books. In addition to using other resources such as official trends from private sector surveys, government documents, records and statistics and university, governmental and other research based databases.

3.3.5 Data Processing, Analysis and Interpretation

“Science is a means to understanding that involves a repetitive interplay between theoretical ideas and empirical evidence...thus data and facts lead to tentative theory” (Singleton & Straits 1999, p 455). The primary and secondary source data in this study was raw data consisting of qualitative and quantitative material that is difficult to analyse and interpret without further processing. Computer programs were needed within this study to calculate, scale and plot positions within the psychometric risk paradigm. Data processed from its raw form can be more easily interpreted, analysed and clarified so responses to the research questions can be discovered (Walliman, 2006; Stangor, 1998).

The study developed and tested research questions using both qualitative and quantitative based research data analysis techniques. This approach was necessary because a qualitative Likert scale based survey was conducted on the public. However to analyse, interpret and display the results within the psychometric risk paradigm, a quantitative based approach was needed. Because the study was based on the empirical science of statistical measurement using aspects of human social risk perception, it contained a number of limitations. The study did not address amplification or attenuation of social risk perceptions because it was intended to be a snapshot of public risk perception at the time of writing. Due to ethical considerations, the study did not address factors involving race, creed, political or religious convictions on the part of participants or on the trends that were studied. Further limitations regarding the study may be found in Section 4.7. The study used the Statistical Package for the Social Sciences (SPSS) for Windows, Version 14 for raw data analysis.

3.3.6 Quantative Research Data Analysis

According to Thorndike (1997, p.13) quantative research entails “measurement [that] involves assigning numbers to objects or people”. Walliman (2006, p.212) expands on this definition and states that “quantative data can measured...measurement implies some form of magnitude, usually expressed in numbers [which] mathematical procedures can be applied to analyse the data. These [procedures] might be simple, such as counts or percentages or more sophisticated, such as statistical tests or mathematical models.”

The nature of the study demanded that a number of data analysis methodologies were employed to gain useful elements out of the data collected. Techniques to extract information included calculation of the mean and standard deviation and correlation analysis approaches. Quantative based data results were entered into a data analysis matrix using a spreadsheet data editor (Microsoft Excel, 2002), which allowed the data to be further analysed using the SPSS analysis program.

3.3.7 Qualitative Research Data Analysis

Qualitative research is based on “field observations that are analysed without statistics” (Dooley, 2001, p.248), or put another way:

“Qualitative research is concerned with non statistical methods of inquiry and analysis of social phenomena. It draws on an inductive process in which themes and categories emerge through the analysis of data collected by such techniques as interviews, observations, [written material, images, opinions or feelings]... Samples are usually small and are often purposively selected. Qualitative research uses detailed descriptions from the perspective of the research participants themselves as a means of examining specific issues and problems under study” (McCoy, 1995, p.2009).

Qualitative research is presented in descriptive formats such as words and pictures. A person’s belief is difficult to quantify by mathematical methods such as statistics and therefore another method must be considered. The survey used a Likert scale for its qualitative test instrument as Likert scales have many benefits for this type of research (3.2.2 Likert Scales and Survey Design). Data analysis was also carried out on both the pilot and main study using the following methodology: Data editing, data reduction and computer aided analysis.

Data editing enabled the identification and elimination of mistakes written by participants within the survey. The process ensures that the survey was complete, accurate (improving the validity of the survey) and interpretations of the questions were uniform in nature (Cohen et al, 2000). Data reduction consisted of preventing data overload by coding data in preparation for analysis and involves sorting information into categories by providing labels (codes) to each response within the survey. Codes may then be entered into a computer data analysis program where further analysis can be carried out (Walliman, 2006). Computer aided analysis can be then used to process qualitative survey data to produce graphs, tables or statistics, which can highlight trends or themes within the study.

3.4 The Study Controls

The study's controls were taken from Slovic's (1987) psychometric study entitled "Perception of Risk". Slovic investigated 81 technologies and activities to gain an understanding of how the American general public perceived these risks. Slovic's aim was to "aid policy makers by improving communication between them and the public, by directing educational efforts, and by predicting public responses to new technologies (genetic engineering), events, (safety records or accidents) and new risk management strategies (warning labels, regulations, substitute products)" (Slovic, 1987, p.281).

One of the reliability mechanisms used in the study was equivalence forms reliability measurement. This method used the results of comparable studies to validate the reliability of research instruments used in the study. Equivalence measurement works on the assumption that if the current study's instrument (survey) yields similar results to previous comparable studies, then the study's research instrument can be said to be reliable (Cohen et al 2000). This study used Slovic's 1987 research for guidance and equivalence reliability. Four out of Slovic's 81 activities and technologies were used as the study's controls. Each activity/technology was taken from one quadrant of Slovic's psychometric paradigm. These controls were:

- Microwave Ovens
- Coal Burning (Pollution)
- Appliance Fires
- Commercial Aviation

These particular controls were selected by the researcher because, the study's survey involved members of the general public and it was considered that each of these activities and technologies would be familiar. It was considered that the study's primary control

measurement of familiarity and dread on these controls would produce a more reliable measure, than evaluating more unknown or unfamiliar public risks such as cadmium usage, skyscraper fires or nuclear weapons fallout.

3.5 The Study's Experimental Control

There is a general lack of current Australian based research into psychometric risk in general and in particular regarding terrorism. Nevertheless terrorism is one of those risks which affect many people. When a successful terrorism attack occurs, often large numbers of emergency services and innocent people are directly involved and even a greater number of people (such as families and friends of the victims and the media) are indirectly involved. As large numbers of people are both directly and indirectly affected over a short space of time, it can be seen how this threat to the general public is important (Bongar et al, 2007, p.p. 111-112).

Although statistically terrorist attacks are small in number and the chance of being involved in a successful attack is relatively small, terrorism is however a current and ongoing threat to the Australian public. This trend is unlikely to dissipate, given Australia's continued and sustained diplomatic, economic and military support to our allies in fighting the "war on terror"

3.6 Reliability and Validity Methodology

The study's reliability was measured through three techniques; Equivalence Forms Reliability Measurement applied in conjunction with Slovic's (1987) psychometric social risk study, Cronbach's co-efficient alpha test and expert peer review. Validity for the project was measured through face and content based validity techniques, these include Gusset's t-testing sampling methodology and Pearson's product moment correlation coefficient test. The study's design principles ensured that the reliability of the research instrument aided the paper's content validity. The survey's design was intended to clearly and unambiguously explain to participants the survey's aim, purpose and the participant's role in achieving specific outcomes. An information sheet was provided to each participant (Appendix C), along with an informed consent form to fill in (Appendix D). An integral part to the survey's design was to gain accurate and relevant information on the issues raised within the research questions. McLennan (1999, pp 9-33) proposed the following points when designing and conducting a survey, these include:

- "Use an up-to-date and accurate sampling frame;
- Careful questionnaire design and adequate testing;

- Careful selection of the time the survey is conducted;
- Enable respondents to complete the survey accurately within a reasonable time;
- Use of language that was readily understood by respondents;
- Careful design of the processing system, including edit checks;
- The overall appearance of the survey should be uncluttered on the form;
- The survey's design [should be] easily processed by both people and machines;
- Being aware of all the factors [errors] affecting the topic under consideration."

"The validity of research results is directly related to the number and size of sampling and non sampling errors" (Kinnear & Taylor, 1996, p. 508). Sampling errors result from differences between the sample population estimate and the true value for the entire population. For example if the average age in a sampled population is 26 and the average age of the total population is 27, then the difference between these two samples produces a sampling error. This error is a normal expectation in the sampling process however it affects the accuracy of the results. To this end, the study attempted to minimise the possibility for sampling error through the survey's design and by using a large sample size, which is more representative of the total population (Ruane, 2005, p 106). "Sampling error can be measured and used to determine how close a sample estimate is to its corresponding 'true value' in the target population" (McLennan, W, 1999, p 37). Sampling error was measured by using standard deviation; a statistical measure of the dispersion, spread or variability of a research sample from a central point (Biemer, 2003, p 32).

3.7 Ethics

Ethics is primarily about a person's value system and therefore it is a difficult subject to define. Each person has different set of personal values, so every person will have a different set of ethics (Rosnow & Rosenthal, 1997). According to the Oxford English Dictionary (1989), ethics are concerned with "the science of morals; the department of study concerned with the principles of human duty" or put another way, ethics are the moral compass by which a person is guided. Although this may be a good general definition, it is little help to issues concerned with conducting social research. The Shorter Oxford English Dictionary cited in Gregory (2003, p.p. 5-6), defines sociological research as "a systematic investigation of human behaviour in order to collect information or establish facts". Although seeking the truth is always a noble enterprise, research must be conducted in a meticulous manner with integrity to the project (research methods and survey questions), the researcher and to the researcher's participants.

To ensure high standards of professional conduct, students undertaking research need ethical clearance from Edith Cowan University's Ethics Committee to ensure the integrity of the research undertaken and to protect the reputation and standards of Edith Cowan University (ECU).

The primary basis of this study required a public survey into social risk perception and as such required human participants. The use of human participants required clearance approval from the Human Research Ethics Committee (HREC) sought before research commenced (ECU Guidelines on the Responsible Conduct of Research and Scholarship, 2003). To this end, the study ensured that all research undertaken maintained the integrity of the study by conforming to the appropriate university ethical standards and guidelines. Key study ethical considerations were based on issues regarding informed consent, research merit and integrity, justice, beneficence and respect.

3.7.1 Informed Consent

"Information given to participants should be presented in such a way that they have a clear understanding of what is to be involved and should include a description of all aspects of the research project" (Edith Cowan University, n.d). To ensure participants had a clear understanding of the study and to avoid any confusion, the study embedded a consent form and an information letter at the beginning of each survey. This approach was taken to inform potential participants of the anonymous and voluntary nature of the survey and its purpose. Further information contained within these documents, advised participants of the survey's age restriction limitation and the expected benefits to both the participants and the wider community.

3.7.2 Research Merit and Integrity

"Research that has merit is: justifiable by its potential benefit, which may include its contribution to knowledge and understanding, to improved social welfare and individual wellbeing, and to the skill and expertise of researchers" (Australian Research Council, 2007, p. 12). The study has merit and is justifiable in potential benefits to individuals (students and researchers), risk professionals, the general community, sociological based research and the security science discipline. The design of the study incorporated an extensive literature review of psychometric risk perceptions, which found limited evidence of previous research in this field; indicating merit in conducting this research. By adhering to the ethical guidelines set

down by Edith Cowan University and with the guidance of the study's supervisor, the study ensured the integrity of the participants, the university and the researcher.

3.7.3 Justice

"In research [justice] is taking into account the scope and objectives of the proposed research [and ensuring that] the selection, exclusion and inclusion of categories of research participants is fair, and is accurately described in the results of the research" (Australian Research Council, 2007, p. 12). A key consideration in the design and planning stages of the research was to ensure that the surveying process was fair and equitable. The study was based on public social risk perceptions involving terrorism. As Australia is a multicultural society, the Australian public consists of people who come from many cultures, backgrounds and ethnicity. Therefore surveying the Australian public will require interviewing a wide variety of different people. In the interests of integrity, justice and tolerance, the survey did not prevent any individual from participating, regardless of gender, race, creed, occupation or social status.

3.7.4 Beneficence

"The likely benefit of the research must justify any risks of harm or discomfort to participants" (Australian Research Council, 2007, p.13). The participants may be faced with minor personal ethical dilemmas regarding their perception on aspects of Australia's participation on the 'war on terror' and issues concerning national security upgrades post 9/11. In addition, terrorism research based questions where participants are asked for their responses to a range of social and security enquiries, which they may not have considered before may raise personal, work based or ethical dilemmas. As this may be a sensitive subject, the researcher acknowledges some members of the public may find the nature of the research distressing. Participants were informed (both verbally and in writing) of the topic, its purpose and the expected benefits of this type of research, prior to the undertaking the survey. Furthermore, participants could withdraw their support from the survey at any time without explanation or repercussions.

The benefit to the individual will be low; however, this research is intended to be a benefit for the general wider community. Participants can gain satisfaction however, in the knowledge that they are contributing to research that will benefit students, future researchers and sections of industry, whose purpose is in the reduction of risks to the general public. One significant benefit of the study is that it will contribute to the overall science of social risk perception research. Another benefit is that the study will enlighten the public to consider risk related

issues that may affect them, thus acting as an aid in the decision-making process. It is also hoped that the study will provoke healthy debate amongst members of the general community and professionals alike, so that lasting solutions to terrorism related issues can be found. A final benefit of this study is that it will contribute to the growing body of knowledge in the discipline of security science.

3.7.5 Respect

“Respect for human beings is recognition of their intrinsic value. In human research, this recognition includes abiding by the values of research merit and integrity, justice and beneficence” (Australian Research Council, 2007, p.13). Respect is key to any social research undertaking. The researcher acknowledges the benefits of a multicultural society and appreciates people from all cultures are involved within the study. As such, respect of participants’ welfare, beliefs and customs was a key consideration throughout the study. Ethics can be seen as the basis for integrity; in research, the conduct of the researcher and their commitment to protect their research subjects from physical, psychological, or emotion harm must be paramount.

3.8 Conclusion

This chapter presented the materials and methods that were employed throughout the study. Specifically under the key study objectives (Section 3.2), the study’s purpose was discussed and a clear definition of the differences between a terrorist incident and a terrorist attack was presented. The study’s design (Section 3.3) emphasised the process of how the study was conducted including investigating the problem definition (Section 3.3.1) as well as the Likert scale and the survey’s design (Section 3.3.2), which incorporated a detailed analysis of the study’s research instrument. Target sampling (Section 3.3.3) followed, which demonstrated the methodology of the survey’s sampling technique, demographics and locations. The data collection phase of the study (Section 3.3.4) discussed how the researcher obtained primary and secondary data used in the study. In addition, this section also demonstrated how the Likert scale survey was used to formulate data into the psychometric paradigm.

Data processing (Section 3.3.5) explained how the primary and secondary source data was analysed and interpreted. Computer aided programs were used in this study to calculate, scale and plot positions within the psychometric risk paradigm. Data analysis and interpretation (Section 3.3.6) provided an insight into how qualitative and quantitative based research data was used to both develop and test the research questions used within the study. The differences in qualitative and quantitative data analysis were also examined.

The study's controls (Section 3.4) were appraised, in particular, why they were chosen and how they benefited the overall study. The study's experimental control (Section 3.5) demonstrated how terrorism is an ongoing ever present risk in Australia. This issue was one of the main reasons terrorism was chosen as an experimental risk, as there is a general lack of current Australian based research into psychometric risk in general and terrorism in particular. The study's reliability and validity methodology (Section 3.6) was examined in particular; the reliability of the study was measured using three processes these included: Equivalence forms reliability measurement, Cronbach's co-efficient alpha test and expert peer review. Whereas face and content based validity techniques employed within the study used Gusset's t-testing sampling and Pearson's product moment correlation coefficient methodologies. Finally a detailed discussion on Ethics (Section 3.7) concluded the chapter.

CHAPTER 4

PILOT STUDY

4.1 Introduction

The following chapter presents a detailed analysis and background of the pilot study. The pilot study considers how the study was performed and the problems which were experienced. The interpretation of the data (Section 4.3) includes spatial factor representation analysis (Section 4.3.1) and factor characteristic profiling (Section 4.3.2), focusing on how the research categories compared to one another, based on the study's underlying themes.

The pilot study's reliability (Section 4.4) was ascertained using Cronbach alpha coefficient and equivalence reliability measurements and used Slovic's (1987) study as its base. By using one sample t-testing methodology, the study's demographic validity analysis (Section 4.5) could examine the pilot study's validity, in terms of significant differences between age and gender risk perception. In addition, Pearson's product moment correlation coefficient (Section 4.6) was used to determine the study's Dread and Familiarity risk co-efficients. Finally, the chapter concludes by examining the study limitations that hindered the reliability and validity of the project.

4.2 Pilot Study's Background

The pilot study took place over a two-week period, which consisted of 60 participants who visited the Lakeside Joondalup Shopping City's bus, train and taxi depots. The pilot study used a survey based approach to determine the public's perceptual response in relation to familiarity and dread characteristics of terrorism, in addition to four other public risks that are commonly found in Australia (see Appendix E). It was critical that the pilot study was as effective as it could be before the main study commenced and to this end, two pilot studies were undertaken.

The first pilot study had inconsistencies in both Cronbach alpha reliability and validity measures within the study, additionally the participants in the first pilot study took an average of 7 minutes (SD 1.36) to complete the entire survey. The time period was considered too long and therefore needed to be reduced. It was for these reasons that a revised secondary survey was needed. To resolve these issues, a second pilot study was conducted which aimed to improve the study's reliability and validity measures. Questions 1, 2, 3, 5, 6 and 8 were changed, with the aim of improving the previously listed problems. The reason behind the

changes to these questions was that they were not adequately addressing the study's underpinning themes, in relation to dread and familiarity risk ratings. Therefore, the following data solely represents the results from pilot study two, identified henceforth as the pilot study. Data from the pilot study was analysed through the computer software program Statistical Package for the Social Sciences (SPSS), Version 14.0.

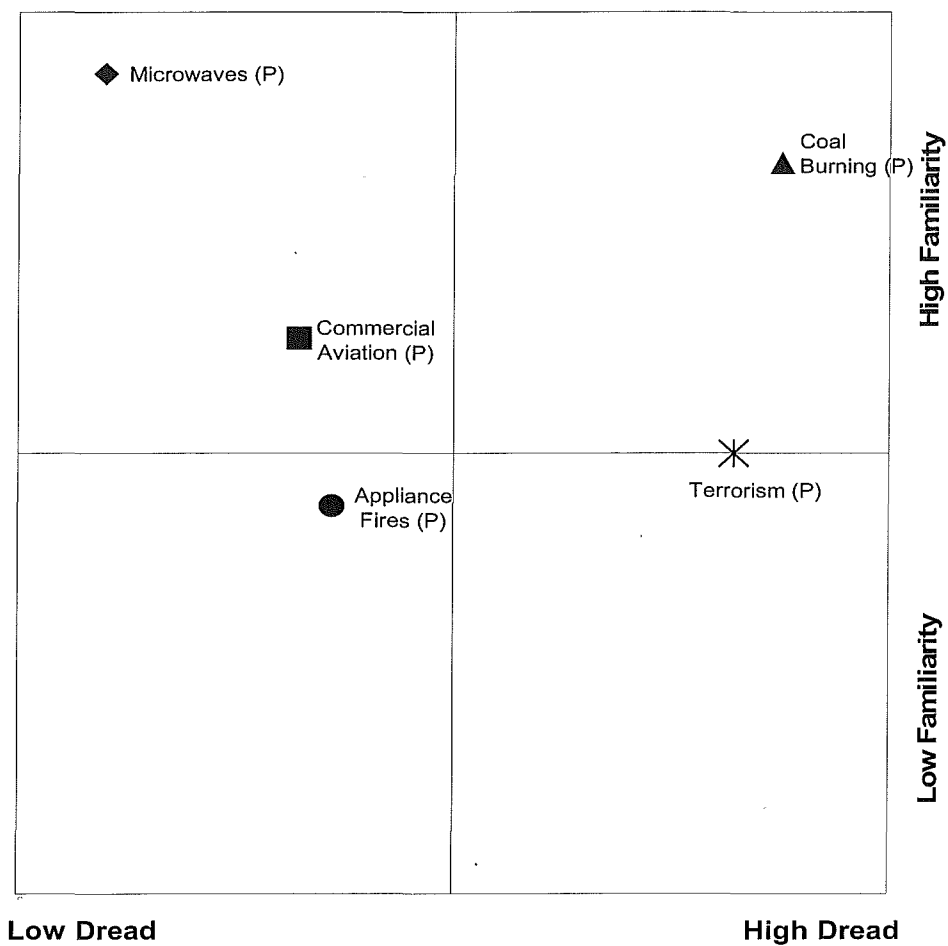
4.3 Pilot Study Methodology and Analysis

Quantitative measurements or factors represent the base data for the study. As each factor will be different to one another, there will inevitably be variations among each item studied. Using factor analysis however, each factor can be analysed with one another to elicit common trends within the study. Hair et al (1992) describes factor analysis as:

“A statistical approach that can be used to analyse interrelationships among a large number of variables and to explain these variables in terms of their common underlying dimensions (factors). The approach involves finding a way of condensing the information contained in a number of original variables into a smaller set of dimensions (factors) with a minimum loss of information.”

Spatial factor representation is the process of applying analytical techniques to graphically model complex spatial factor interactions, which incorporate information about factor location and other attributes. The technique is used to illustrate trends, estimate and predict future events and for interpreting and evaluating complex quantitative data into an easily understandable graphical format (Jupp, 2006, p.p. 286, 287). Quantative based data results from the pilot study was entered into a data analysis matrix using a spreadsheet data editor (Microsoft Excel, 2002). The data was then compiled to obtain an average Dread and Familiarity rating from the five risk categories, producing a spatial factor representation analysis chart.

The pilot study indicated (Figure 4.1) that the public's risk perception of a terrorist act ranked the second lowest in terms of familiarity (slightly more than that of appliance fires and slightly less than commercial aviation risks), however, ranked second highest in terms of dread. This dread ranking was similar to that of pollution from coal burning. Although these results cannot be considered definitive (due to the small sample size of the pilot study), the results do indicate that from a public based perspective, people viewed pollution from coal burning a greater threat to their well being then compared with being involved in a potential terrorist act.



Key: P = Pilot Study.

Figure 4.1 Pilot Study Spatial Factor Representation

4.3.1 Factor Characteristic Profiling

Factor characteristic profiling is a technique that displays how each activity or technology interrelates to one another based on the pilot study’s main underlining themes (Figure 4.2).

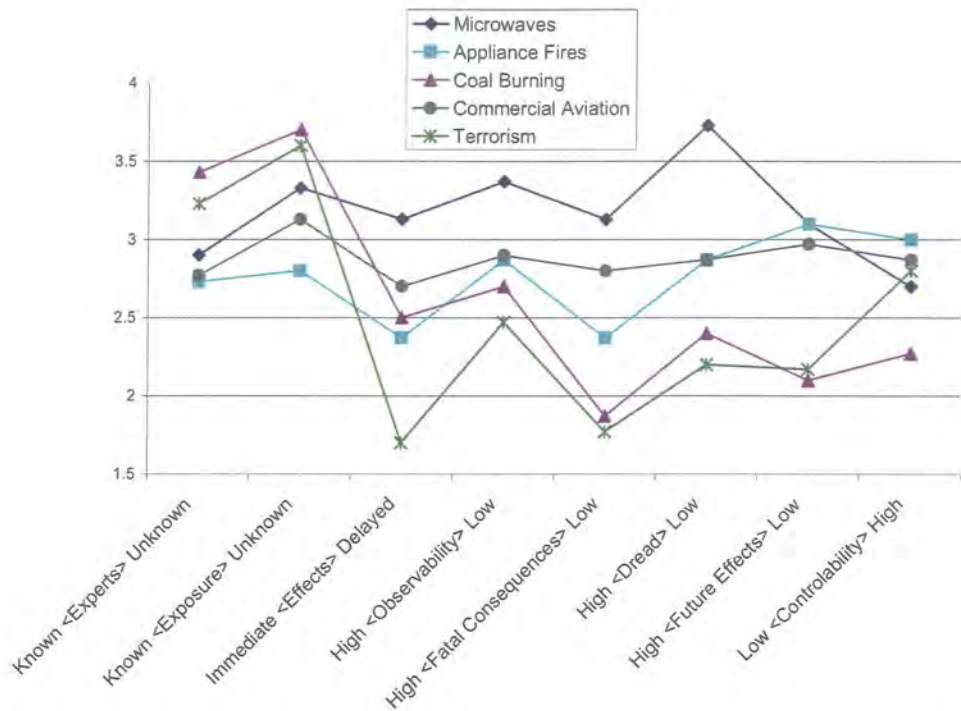


Figure 4.2 Factor Characteristic Profiles of Each Activity/Technology

The profile demonstrates the characteristic means of each factor of dread and familiarity. Each risk category’s profile usually follows a similar path, the contrasts to this pattern are in the immediate effects category (terrorism) (Mean=1.70, S.D=0.79), as compared to the microwave immediate effects category (Mean=3.13, S.D=0.94). Another comparison is in the risk category of terrorism dread (Mean=2.20, S.D=1.13), as compared to microwave dread category (Mean=3.73, S.D=0.83). Interestingly, respondents perceived terrorism as more controllable (Mean=2.8, S.D=1.22) than pollution from coal burning (Mean=2.27, S.D=0.94). Respondents also perceived the risks to future generations (future effects) as almost the same for microwaves (Mean=3.1, S.D=0.99), appliance fires (Mean=3.1, S.D=1.03) and commercial aviation (Mean=2.97, S.D=0.96). Finally participants perceived similar fears for future generations (future effects) in regard to both terrorism (Mean=2.17, S.D=1.18) and pollution from coal burning (Mean=2.1, S.D=0.99).

4.4 Pilot Study Reliability Analysis

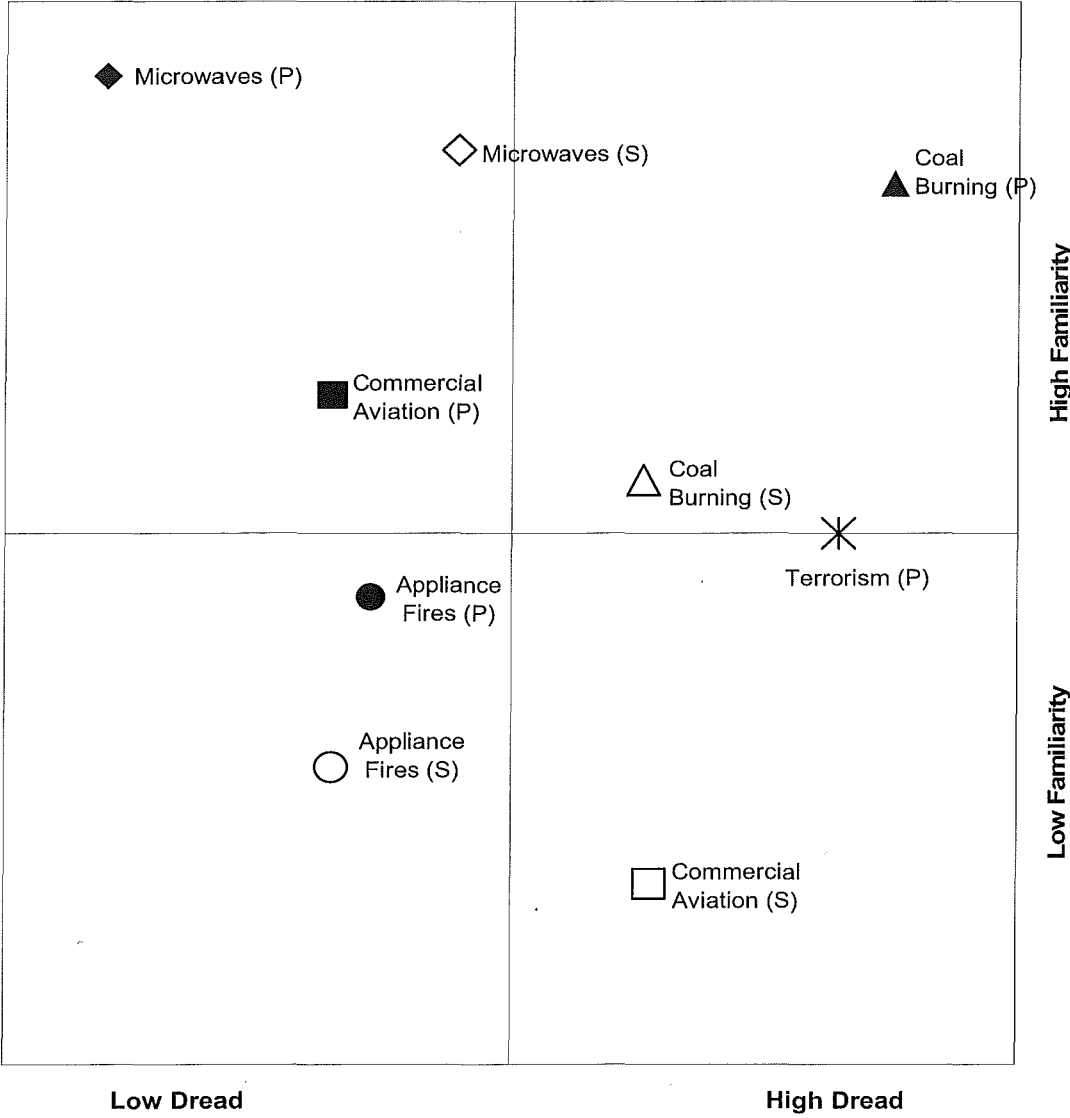
Cronbach alpha reliability analysis was used for both pilot studies. Pilot study one yielded mean reliability coefficients of $\alpha=0.49$ (dread) and $\alpha=0.28$ (familiarity), which demonstrated low reliability. According to Nunnally and Bernstein (1994, pp. 264-265), reliability coefficients of a value of 0.7 are acceptable in the early stages of research; however, researchers should aim at 0.8 or higher for the final outcome. Because the first pilot study's reliability was low, its corresponding validity ratings (both face and content) also scored a minimal rating. This led to the changes in the survey questions outlined earlier in the chapter. Cronbach Alpha coefficient results for pilot study two were considerably improved (Table 4.1).

Factor	Dread	Familiarity
Microwave Dread	0.8	
Microwave Familiarity		0.1
Appliance Fire Dread	0.7	
Appliance Fire Familiarity		0.2
Coal Burning Dread	0.8	
Coal Burning Familiarity		0.7
Commercial Aviation Dread	0.8	
Commercial Aviation Familiarity		0.1
Terrorism Dread	0.7	
Terrorism Familiarity		0.4
Mean	0.76 (0.055)	0.3 (0.255)

Table 4.1 Pilot Study Two: Reliability Analysis - Scale (Cronbach Alpha)

Pilot study two yielded a high reliable mean coefficient of $\alpha=0.8$ (S.D=0.06) for dread risk and a moderately low reliable mean coefficient of $\alpha=0.3$ (S.D=0.25) for familiarity to risk. One unexpected result to the changes in the second pilot study was a drop in the average time to fill in the survey. The average time taken to complete the first pilot study was 7 minutes (SD 1.36), whereas the average time taken to complete the second pilot study reduced to 5 minutes (SD 0.91). In addition reliability was achieved through equivalence reliability measurements based on a spatial comparison of Slovic's (1987) psychometric study. The study achieved a spatial quadrant match to three out of four of the control items, namely: microwave ovens, coal burning and appliance fires (Figure 4.3). In the pilot study, the remaining control of commercial aviation had a low dread risk rating and a high familiarity risk rating as compared to Slovic's (1987) psychometric study. Due to the pilot study's small size, definitive conclusions cannot be drawn. The use of this spatial comparison technique also demonstrated

the reliability and validity (content and face validity) of the research instrument as similar results would not have been achievable otherwise.



Key **P** = Pilot Study, **S** = Slovic's 1987 Psychometric Study.

Figure 4.3 Comparison of Slovic's Psychometric Study with the Pilot Study Results

4.5 Demographic Validity Analysis

Demographic analysis of the study consisted of using Gusset's t-testing methodology. Essentially a "t-test is a statistic that measures the difference between the means of one sample on two separate occasions or between two samples on one occasion" (Cohen, 2000, p. 81). An example of a t-test result is $[t(12) = -2.571, p = .024]$, with the t value of 2.571 being a standard deviation score based on the sample's t-distribution spread. This example has 12 degrees of freedom (df) or the sum of values being tested minus two, which has a significance (two tailed) probability (p) value of .024. In this measure the p value adds up to 1.0 (100), so for this example 99.76 is the confidence level that people either agree or disagree about a particular issue not based on a degree of chance. The maxim states that a value is statistically significant if the α (alpha) level is $p \leq 0.1, 0.05, 0.01$. In social research the "rule of thumb" is the lower the alpha level the more significant the result (Trochim, 2006, p.1).

4.5.1 Gender Risk Perception

The pilot study's demographic was broken down into male and female genders, with the results indicating that there were no significant differences between the genders.

4.5.2 Age Risk Perception

Using independent t-test methodology, data was further broken down to analyse group based risk perception of specific survey questions related to each category. Although the pilot study's sample size was small, some significant differences between age groups were apparent. Commercial aviation dread produced the most significant differences between the 18-25 and 36-45 age groups $[t(14) = -2.651, p = .019]$, the 18-25 and 46-55 age groups $[t(12) = -2.571, p = .024]$, and between the 35-45 and 56-65 age groups $[t(6) = 3.341, p = .017]$.

Appliance fire familiarity was the only familiarity based control factor which demonstrated significant differences within the age groups. The 18-25 age range showed a significant difference to the 26-35 age range $[t(16) = 2.314, p = .034]$. Significant results were also demonstrated with the 26-35 and 36-45 age groups $[t(10) = -2.378, p = .039]$ and the 46-55 and 56-55 age groups $[t(4) = 3.212, p = .033]$ and finally for the 46-55 and 65+ ranges $[t(2) = -5.000, p = .038]$. Significant differences in terrorism familiarity were also demonstrated in 26-35 and 36-45 age ranges $[t(10) = 3.651, p = .004]$ and for the 36-45 and 56-65 age groups $[t(6) = -5.565, p = .001]$. Terrorism dread produced a significant difference in the 46-55 and 56-65 age range $[t(4) = -2.828, p = .047]$.

4.6 Pearson's Product Moment Correlation Coefficient

The pilot study used Pearson's product moment correlation coefficient as its validity assessment tool. Rosnow & Rosenthal (2005, p.144) describe the function of Pearson's test:

"Pearson's r measures the strength of association (i.e., the degree of relatedness) of two variables, such as height and weight. One characteristic of the Pearson r is that it ranges from -1.0 through 0 to +1.0. A value of 0 means that two variables being correlated have no linear relation...A value of +1.0 means that two variables have a perfect positive linear relation: As the scores on one variable increases, there are perfectly predictable increases in the scores on the other variable...A value of -1.0 produces an opposite response"

According to Nardi (2006, p. 171) "Pearson's r measures how much change in the z scores of one variable is related to change in the z -scores of the other variable," or to what degree does one variable compare to another. Pearson's r value is normally represented as a two digit number with *high* correlation coefficients of 0.8 or 0.9, whether positive or negative, show that the combined measured variables compare very closely to one another (Table 4.2).

0.9 to 1.0 very high correlation
0.7 to 0.9 high correlation
0.5 to 0.7 moderate correlation
0.3 to 0.5 low correlation
0.0 to 0.3 little correlation

Table 4.2 Pearson Correlation Values (Arkkelin, n.d)

The Pearson's product moment correlation coefficient of the pilot study was measured, producing a low familiarity and dread result (Table 4.3). An overall low to moderate validity for both the pilot study's familiarity and dread rankings was achieved.

Factor	r	Standard Deviation
Microwave Dread	0.5	0.0663
Microwave Familiarity	0.2	0.1335
Appliance Fire Dread	0.3	0.2120
Appliance Fire Familiarity	0.2	0.1487
Coal Burning Dread	0.5	0.0949
Coal Burning Familiarity	0.5	0.1667
Commercial Aviation Dread	0.5	0.1670
Commercial Aviation Familiarity	0.4	0.2079
Terrorism Dread	0.4	0.1058
Terrorism Familiarity	0.3	0.0697
Overall Average Dread	r = 0.4	S.D. 0.0894
Overall Average Familiarity	r = 0.3	S.D. 0.1304

Table 4.3 Pearson's Product Moment Correlation Coefficient Table

4.7 Study Limitations

The analysis phase of the pilot study produced a number of study limitations which had to be overcome or considered. The nature of risk itself (Section 4.7.1) was a limitation in regards to gathering data, primarily because not all respondents perceived risk in same manner. The study's methodology (Section 4.7.2) was of a particular concern, as many socio-economic barriers had the potential to hinder the pilot study. Finally the pilot study's research design (Section 4.7.3) limitations were also examined, in particular limitations concerning Likert surveys (Section 4.7.4) and how these may impact on the pilot study's validity and reliability.

4.7.1 The Nature of Risk

Risk is a deceptive concept; this is because the word risk can have multiple definitions that are used in various contexts (Outreville, 1998, p.2). Risk can be divided into many different categories including social, physical, financial and/or intellectual risk etc. In essence, risk could be considered the prediction of an event or occurrence combined with its associated consequences (AS/NZS: 4360:1999, p.3). To this end the survey questions were developed to channel the participant into thinking about the physical risk category and its associated consequences. The survey questions do not specifically ask direct questions in relation to a particular risk, instead the survey allows the participant to think of all manner of physical risks in relation to each risk category. In this way an overall viewpoint may be obtained for each of the research categories. However, this approach may be seen as a study limitation, as it may be

interpreted that the study is not responding to specific psychometric based questions, which ultimately may reduce either the reliability and or validity of the project.

4.7.2 Study Methodology

According to Cohen et al (2000) and Dixon (1987) (cited in Walliman, 2006, p.80), to conduct a statistical valid sample for a pilot study, thirty people are required. The researcher canvassed two major shopping centres in two different locations to complete the surveys. Pilot studies one and two were completed at Lakeside Joondalup Shopping City by 60 people (30 people per survey). Commercial settings were chosen because they are venues that can accommodate large numbers of the general public. This approach ensures randomness in the study and access to the wider community. In addition, both genders from a variety of nationalities, cultures and social classes may go to these shopping districts regularly on any given day.

The pilot study's target population consisted of members of the general community over the age of 18 that visited these locations in late 2007 to early 2008. The study sampling design was based on probability sampling methodology; a technique based on selecting people at random by day and night from the wider population. This approach was chosen as it contains less risk from bias to the selection of cases from the researcher. In addition, the laws of mathematical probability can be applied to ensure the accuracy of the sample is maintained (Thyer, 2001; Dooley, 2001; Cohen et al 2000; Singleton & Straits 1999).

The study's intent was to achieve a cross-section of the Australian population. Limitations may exist due to socio-economical factors which may reduce either the reliability or validity of the pilot study. These socio-economical factors include financial restrictions of people or social bias from higher economic social classes refusing to shop in these locations. Finally, the lack of access to these locations, due to distance or lack of public or vehicular transport may also have affected certain groups such as the homeless, aged or physically disabled from taking part in the survey.

4.7.3 Research Design

"There is no single blueprint for planning research. Research design is governed by the notion of 'fitness for purpose'...The purpose of the research determines the methodology and design of the research" (Cohen et al, 2000, p 73). With this in mind the study set out to design an experimental study design that would fit the purpose of the research. The study used a 7-stage study design (see Figure 1.1), to collect, analyse and interpret data in such a way that ensured

the integrity, quality and reliability in both the research and the data results. However, as this is an experimental research design it must be noted that limitations may exist. Limitations may include deficiencies in any of the 7 stages of the research design. These limitations may be due to the researcher's inexperience in conducting social research, which may also include the interpretation of the underlying methodology that underpins the study.

4.7.4 Likert Surveys

"All research begins with the selection of a problem" (Singleton & Straights, 1999, p. 65). One of the primary problems selected for this study was how the public's social risk perception of terrorism contrasts with other known risks. The measure used to determine the response to this problem was the Likert survey, which contains several known limitations. Gravetter & Forzano (2006, p. 335) state that "participants tend to avoid the two extreme categories at the opposite ends of the scale, especially if they are identified with labels that indicate extreme attitudes or opinions." Because the study had used this type of scale, then it was reasonable to presume that this study experienced these similar limitations.

Another limitation with using Likert scales is that participants can tend to respond to questions in the same way – a tendency referred to as the *response set* or *acquiescent responding* (Gravetter & Forzano, 2006, p.336). An example of this tendency is when participants respond to all the questions with a positive or neutral response. The study's survey endeavoured to minimise this limitation by phrasing questions in both the positive and negative, resulting in the participant thinking about what the question is asking before giving their response. However, it is the nature of social research that even using these techniques, responses may still have bias due to the participant's response set.

A final limitation of Likert surveys is the closed structure of the survey questions and that participants may only respond to the question within a defined structure. The technique is criticized as responses obtained may not reflect the true perception of the candidate being interviewed (Cohen et al, 2000, p.254). Although the survey was structured with closed ended type questions, the study believed that as the questions were not wholly specific, the participant may define any number of risks he or she feels appropriate in response to that particular question within the subject's category. However, it may be seen that this approach also has limitations. One such limitation may be the lack of definition of the research question within a particular context, therefore jeopardizing both the reliability and validity of the project as a whole. Despite these limitations, Jupp (2006, p.161) stated that "Likert attitudinal scales are a useful technique, since it is possible to make a research tool that is very attractive

to participants, and they can therefore become much more likely to be completed, improving response rates and generalization reliability.”

4.8 Conclusion

The chapter presented a detailed analysis of both pilot studies. The chapter explored the mechanics of the study which include: the pilot study’s methodology and the pilot study’s analysis; which presented the pilot study’s spatial factor representation and factor characteristic profiling results. The pilot study reliability analysis was further examined, in particular some of the problems experienced in Cronbach Alpha reliability. The validity of the study was also considered, however subsequent results revealed multiple inconsistencies in the overall reliability and validity of the first pilot study.

Most of the initial survey questions did not adequately respond to the study’s underpinning themes (Figure 4.2), which related to the overall measurement of both dread and familiarity risk rankings. These questions were subsequently revised and a second pilot study undertaken. The second pilot study showed an improvement in Cronbach Alpha reliability, yielding a high reliable measure of $\alpha=0.8$ (S.D=0.06) for dread and a moderate low reliable measure of $\alpha=0.3$ (S.D=0.25) for familiarity.

Additional reliability was demonstrated through equivalence reliability measurements based on a comparison of Slovic’s (1987) psychometric study. Using this technique, the pilot study achieved a respectable spatial quadrant match of three out of four of the control items. The remaining control of commercial aviation had a low dread risk rating and a high familiarity risk rating as compared to Slovic’s (1987) psychometric study. Due to the pilot study’s small sample size, definitive conclusions could not be drawn. The use of this technique also demonstrated the reliability and validity of the research instrument (content and face validity) as similar results would not have been achievable otherwise.

Demographic Validity Analysis was conducted using Gusset’s t-testing methodology, divided into two classes. Gender risk perception indicated there were no discernable significant differences between the genders. The class of age risk perception however demonstrated that despite the study’s small sample size there were some significant differences between age groups. These were namely in the commercial aviation dread, appliance fire familiarity and in the terrorism familiarity and dread categories. Pearson's product moment correlation

coefficient was used as the study's validity assessment tool, achieving an overall low to moderate results for both the pilot study's familiarity and dread risk rankings.

The chapter concluded with a number of limitations that the study had to overcome or consider. These limitations included the nature of risk, the study's methodology and the pilot study's research design. These limitations were considered throughout the study, as neglect of any of these particular limitations would have had significant impacts on either the study's validity and or reliability.

CHAPTER 5

ANALYSIS

5.1 Introduction

The following chapter presents the analysis of the main study, including an explanation on the surveys background, study sampling design and methodology used. The analysis details the surveys demographic populations, which are further broken down in gender and age groups. Key findings of the study revolved around the public perceptions of risks and to this end, extensive t-testing analysis was undertaken in both gender and age group risk perception categories. This approach was taken so that the study could gain an understanding of significant trends towards certain risks. In particular, an understanding of how the participants perceive terrorism risks was extensively examined. The study used spatial analysis representation to examine the interrelationships between each of the variables used within the study.

Factor characteristic profiling was also conducted and was used to graphically display how each activity or technology interrelated to each other. The study used factor characteristic data to profile each of the five activities or technologies into their respective dread and familiarity risk ratings. This approach allowed a comparison of the participant's perceptions towards each activity or technological based risk. The effectiveness of Australia's anti-terrorism awareness campaigns was also investigated, as this aspect was a key assumption within the study. Frequency analysis was used to gauge how effective the public thought these campaigns were. The effect of the 11th September 2001 attacks as well as other recent terrorist events and their impact on the Australian public's perception of their own safety and security was also examined.

The reliability of the study was examined using Cronbach's Alpha reliability measurement, equivalence reliability methodology and peer review. In addition, Pearson's product moment correlation coefficient and Gussets t-testing methodology was also used to determine the validity of the study. Finally the study's limitations concluded the chapter, specifically investigating the study design, Likert survey and the psychometric paradigm limitations.

5.2 Study's Background

The target population for the main study was customers who visited the Centro Warwick Shopping Centre in Western Australia and consisted of members of the general community age 18 years or over. In the suburb of Warwick there were 3,035 residents, with 49.4% males and 50.6% females (Australian Bureau of Statistics, 2008). According the Australian Bureau of Statistic's National Statistical Service's Sample Size Calculator given a total population sample of 3035 people, then 340 people need to be sampled to achieve a 95% confidence level ($p \pm 0.05016$) (National Statistical Service, n.d).

To achieve this 95% confidence level rating, a total of 340 people of both genders, completed the survey which took place over a 4 month period. The study, like the pilot study used a Likert survey to respond to a series of five risk categories each containing eight questions. These questions were designed to gain an insight into the Australian public's perception into terrorism risks which were based on Slovic's (1987) familiarity and dread risk categories. In addition, each of these categories was also used for a simple comparative approach between each of the five activities or technologies (See Appendix E).

Centro Warwick Shopping Centre, a suburb of Warwick was chosen, as the area contains a good mix of commercial and retail services in combination with residential dwellings. In addition, the area contains a number of parks, reserves, three community halls, a library, pubs and numerous take away style restaurants. Warwick is also home to a cinema complex, two schools and is a bus and train transportation hub to both the beach and the city (City of Joondalup, 2006). Commercial venues were also chosen, as these can accommodate large numbers of the general public. Additionally both genders from all nationalities and social classes usually attend these shopping districts on a regular basis. When combined with probability sampling this approach ensures randomness of the survey and access to the wider community.

5.3 Main Study Demographics

A large random cross-section of the general public was needed to produce adequate data so that the main research question could be addressed. To this end, a combination of gender and age demographics was used during the analysis phase of the study. Age and gender were important considerations in the survey as one of the aims of the survey was to determine how does the public's social risk perception of terrorism contrast with other known risks? This primary research question could only be addressed if a large cross-sectional sample of the

public was collected, with various age and gender constructs important factors in determining a response. Table 5.1 provides an age and gender demographic of participants that took part in the survey.

5.3.1 Gender and Age Demographics

Participants who took part in the main study were asked to list their gender to allow a demographic breakdown to be conducted. Of the 340 people who took part in the study, 140 (47.1%) were male and 180 (52.9%) were female (Table 5.1).

		Age						Total
Gender		18-25	26-35	36-45	46-55	56-65	65+	
	Male	64	39	24	13	8	12	160
	Female	92	32	19	21	8	8	180
Total		156	71	43	34	16	20	340

Table 5.1 Age Groups by Gender Category

5.3.2 Gender Risk Perception

Participants’ risk perception was examined using five different activities and technologies based on the dread and familiarity risk factors that underpin the study. Analysis of the main survey using Gusset’s t-testing methodology found that there were two significant differences between the genders. The first of these was in the familiarity category of coal burning which indicated that males are more familiar with coal burning risks than females [$t(338) = -2.126$, $p=0.034$] with a mean difference of 1.4601. The second significant result was in the dread category for terrorism [$t(338) = 3.027$, $p=0.003$] with a mean difference of 3.7000. The results indicated that females had significantly more dread regarding a successful terrorism act than their male counterparts. These results correlate with a number of studies (Fischhoff et al, 2003; Feldman et al, 2008; Goodwin et al 2005). All other activities and technologies tested in the main survey produced no significant results between either gender.

5.3.3 Age Group Risk Perception

Using independent t-test methodology, data was further broken down to analyse specific survey questions relating to each of the study’s categories. Risk differences between the ages did appear to be a factor across all the categories, and there was some significant risk differences in both dread and familiarity rankings. One example is with the Microwave Oven category which produced mixed results between the younger and older participants. The Microwave Oven familiarity category produced a significant [$t(174) = -.124$, $p=0.006$] mean

difference of 3.5000 between the 18-25 and 65+ age demographic. The 36-45 and 65+ demographic produced a significant [$t(61) = 2.257, p=0.028$] mean difference of 3.4273. Older Australians in the 46-55 age bracket, when compared to the 65+ age bracket produced a significant [$t(52) = 2.232, p=0.030$] mean difference of 3.6103. In the Microwave Oven dread category there were two significant mean differences between the 18-25 to 26-35 age range [$t(225) = 2.662, p=0.008$] of 2.4600 and in the 26-35 to 46-55 age range [$t(103) = -2.285, p=0.024$] of 3.4414.

The Appliance Fires category only recorded one significant result in the dread category between the 18-25 to 46-55 age ranges which produced a significant [$t(188) = -2.792, p=0.006$] mean difference of 3.7783. In the Coal Burning dread category, the most significant result was in the 26-35 to 65+ age group [$t(89) = -2.374, p=0.020$] with a mean difference of 3.8803. The 26-35 to 36-45 age groups also had a significant result in this area [$t(112) = -2.098, p=0.038$] with a mean difference of 2.6245.

Key significant differences in Commercial Aviation dread were also found between the 18-25 to 26-35 age groups [$t(225) = 2.229, p=0.027$] with a mean difference of 1.9847. In the 18-25 to 56-65 age groups a significant [$t(170) = 1.978, p=0.050$] mean difference of 3.3894 was produced. In the Commercial Aviation familiarity category there was substantial differences and mixed perception based results across all the age groups. For example significant results were recorded in each age category, some of the more noteworthy results included the 18-25 to 26-35 age group [$t(225) = 2.717, p=0.007$] with a mean difference of 1.9847 while in the 18-25 to 46-55 range [$t(188) = -2.788, p=0.006$], the mean difference was 2.7460.

In the category of Terrorism Dread there was one significant mean difference between the 26-35 age and the 36-45 age range [$t(112) = 2.022, p=0.046$] of 3.0724. The data indicates that there is a diverse range of opinions and risk perceptions amongst participants of all age groups.

5.4 Main Study Analysis

The main study used spatial analysis (Figure 5.1) to examine the interrelationships between each of the variables used in the study. Cohen et al describes the process as “a way of determining the nature of underlying patterns among a large number of variables” (2000, p 354). These patterns may then be used to illustrate trends, to estimate and predict future events and to interpret and evaluate complex quantitative data into an easily understandable graphical format (Jupp, 2006, p.p. 286, 287).

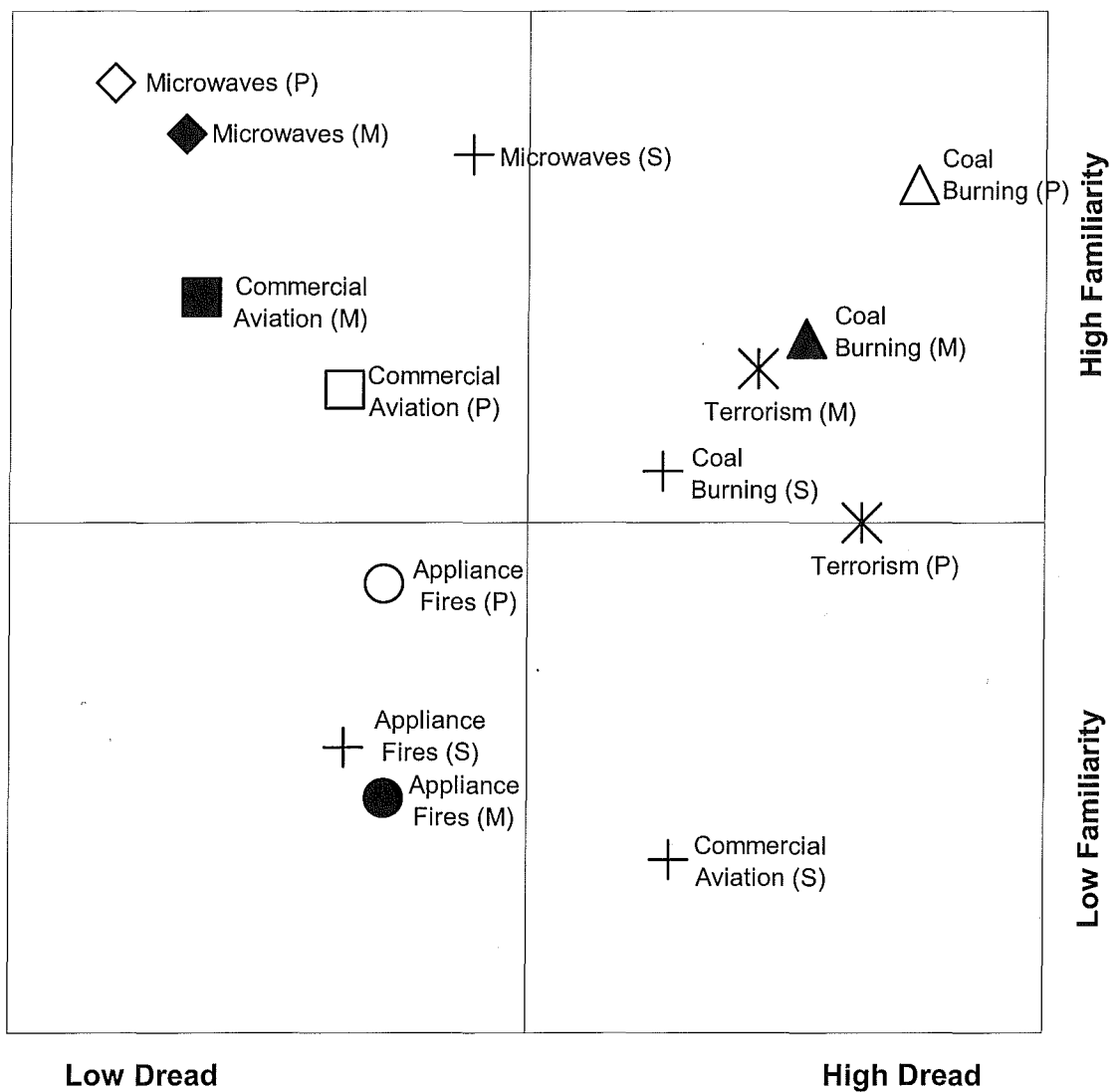


Figure 5.1 Combined Spatial Factor Representation of All Results

The study indicated that the public's risk perception of a terrorist act was actually lower than for the pilot study; however, overall this risk ranked the second highest in terms of dread and ranked midrange in terms of familiarity. This result may be due to Australia's long term high profile anti-terrorism campaigns, verified from frequency analysis of the main survey that demonstrated that the public awareness of anti-terrorism campaigns in Australia was 62.4% (N=212 people). In terms of overall dread, Figure 5.1 demonstrated that coal burning is more of a concern to the general public. The coal burning risk was perceived a greater risk than was the risk of terrorism, next most concerning risks in view of the general public were appliance fires, commercial aviation and lastly microwave ovens.

The study indicated some interesting results in terms of familiarity, where according to the general public appliance fires were the least familiar risk. The next least familiar risk was terrorism, closely followed by coal burning, commercial aviation and lastly microwave ovens. The pilot study when compared to the main study produced similar results in terms of dread. In terms of familiarity the only difference was in the main study where coal burning was seen as less familiar than commercial aviation, whereas in the pilot study commercial aviation was seen as less familiar than coal burning.

Compared to Slovic's (1987) results the study achieved generally higher familiar ratings across all items with the only exception being appliance fires. In terms of dread however the differences between the study and Slovic's results are considerable. Slovic's dread rating for each control item ranked from highest to lowest was commercial aviation, coal burning, microwave ovens and appliance fires. The study demonstrated that coal burning had the highest dread and was therefore the biggest concern to the general public this was followed by terrorism, appliance fires, commercial aviation and finally microwave ovens dread risks.

These item differences between Slovic's (1987) study may be for several reasons including the design and structure of the two surveys, increased public knowledge of the risks, exposure to the activities and or technologies used and the current events of the day. However the closeness of the pilot and the main study results illustrate the effectiveness of the survey instrument in terms of reliability and validity, as similar results would not have been achieved if the instrument was not effective.

5.5 Main Study Factor Characteristic Profiling

The profile demonstrated the means for the underlining characteristics of each surveyed item. One of the main objectives of the study was to examine the current public perceptions of terrorism, as compared to other public based risks, in an Australian context. Factor characteristic profiling was appropriate for this task, as it was used to graphically display the Australian public's perceptions of the various risks (Figure 5.2). Risks of each activity or technology that was significant ≥ 0.6 (mean) were further analysed to gain an additional appreciation of how the public perceived risks.

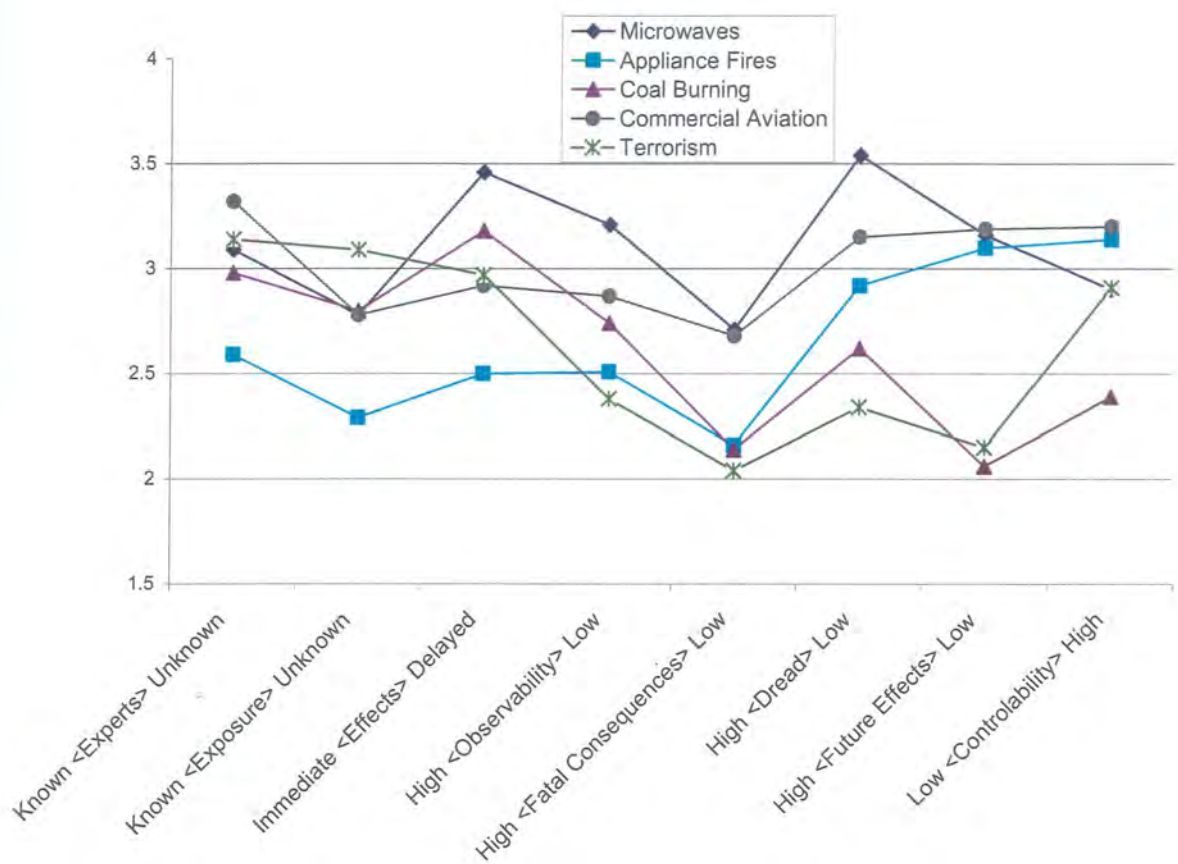


Figure 5.2 Main Study Factor Characteristic Profiling

As can be seen each risk profile follows closely to the other subjects profiles. One interesting result however was in the experts category, where the participants ranked experts understanding of terrorism (Mean=3.14, S.D=1.236) as an unknown quantity, ranking it fourth out of the five activities or technologies studied. As with the pilot factor characteristic profile, most subjects usually followed a similar profile path. The exception to this rule was in the

exposure category for appliance fires (Mean=2.29, S.D=.853), which indicated that the public are familiar with this type of risk. By comparison terrorism in the exposure category produced the significant t-test result of (Mean=3.09, S.D=1.051), which indicated that this is the least known risk to the general public.

According to most of the participants the immediate effects of terrorism (Mean=2.97, S.D=1.132) was only a moderate concern when compared to commercial aviation (Mean=2.92, S.D=.981) or appliance fires (Mean=2.50, S.D=.970). A primary assumption of the study was to establish if the current Australian anti-terrorism campaigns were effective according to the general public. One such result was in the observability category where according to participants the ongoing anti-terrorism awareness campaigns (Mean=2.38, S.D=.954) were effective (see section 5.6) as it ranked the highest of all the study activities and technologies. The next closest result was appliance fires (Mean=2.51, S.D=.961) followed by coal burning (Mean=2.74, S.D=.961), commercial aviation (Mean=2.87, S.D=.936) and lastly, microwave ovens (Mean=3.21, S.D=1.011).

Participants ranked terrorism the highest in the fatal consequences category (Mean=2.04, S.D=.972), slightly behind coal burning (Mean=2.14, S.D=.828) and appliance fires (Mean=2.16, S.D=.923). Fatal consequences from either commercial aviation (Mean=2.68, S.D=.916) or microwave ovens (Mean=2.71, S.D=.966) was considered relatively low according to participants. On the basis of dread risk, terrorism ranked the highest (Mean=2.34, S.D=1.139) followed by coal burning (Mean=2.62, S.D=1.001), appliance fires (Mean=2.92, S.D=1.131), commercial aviation (Mean=3.15, S.D=1.016) and finally, microwave ovens (Mean=3.54, S.D=1.031). The category of future effects to subsequent generations proved interesting, as most participants felt that coal burning (Mean=2.06, S.D=.959) would have a bigger impact than terrorism (Mean=2.15, S.D=1.050). Finally, government control of these particular risks conclude the profile, coal burning (Mean=2.39, S.D=.967) was again considered to have the highest risk in this category, which indicates that the government is not doing enough to control coal burning risks. This was followed by terrorism (Mean=2.91, S.D=1.156), microwave ovens (Mean=2.90, S.D=.900), appliance fires (Mean=3.14, S.D=.952) and finally commercial aviation (Mean=3.20, S.D=.987).

5.6 Effectiveness of Anti-Terrorism Awareness Campaigns

The primary assumption of the study was to establish whether the current Australian government's anti-terrorism campaigns were effective according to the general public. As was seen in main study's factor characteristic profiling section the campaigns are effective, as the anti-terrorism campaigns ranked the highest in the observability category (Mean=2.38, S.D=.954) among all the tested activities and technologies. These results were also verified when frequency analysis of the main survey was undertaken. In the terrorism category participants were asked to give their opinion on the following question: Safety campaigns related to an Australian terrorist based act have made me more vigilant to the associated risks. Out of 340 people who took part in the survey 212 people (62.4%) agreed that the current government anti-terrorism campaigns were effective. This result compared with 46 people (13.6%) that thought our current anti-terrorism campaigns were not effective and 82 people (24.1%) remained neutral

Scale Category	Frequency	Valid Percentage	Cumulative Percentage
Strongly Agree	52	15.3	15.3
Agree	160	47.1	62.4
Neutral	82	24.1	86.5
Disagree	38	11.2	97.6
Strongly Disagree	8	2.4	100.0
Total	340	100	

Table 5.2 Terrorism Risk Awareness (Anti-Terrorism Campaigns)

5.7 Main Study Frequency Analysis Results

As was mentioned earlier, all of study's results were verified by using frequency analysis techniques, the following is the main study's frequency analysis results. In the category of expert understanding participants, were asked to give their opinion to the following question: *Experts do not fully understand the risks associated with an Australian based terrorist act.* In response to this statement 119 (35%) of the participants agreed, whereas 151 (44.4%) of participants disagreed, with the remaining 70 (20.6%) remained neutral in their response. Participants also gave strong reactions for the category of exposure awareness, when asked to respond to the question: *I know when I am exposed to the risks associated with an Australian based terrorist act.* As 103 (30.3%) people agreed to this statement whereas 136 (40%) disagreed and the final 101 (29.7) remaining neutral.

In the category of immediate effects exposure was almost even, as participants had strong views for or against the statement: *The effects of being exposed to an Australian based terrorist act are known immediately*. The results indicated 129 (37.9%) participants agreeing that effects would be immediately seen, whereas 132 (38.9%) participants disagreed with this statement and only 79 people (23.2%) remained neutral. The fatal effects category produced some significant results (Mean=2.04, S.D=0.972) as well, when participants were asked to respond to the statement: *Exposure to the risks of an Australian based terrorist act could seriously damage my health* resulting in 253 (74.5%) people agreeing that exposure to any form of an attack could seriously harm them. Whereas 33 (9.7%) of participants disagreed with this statement and the remaining 54 (15.9%) remained neutral.

In the dread category participants were asked to respond to the following statement: *On a gut reaction, I dread the risks from Australian based terrorist act*. The results indicated 205 (60.5%) people agreed that they did dread a terrorist act, whereas 58 (17%) did feel there was a need to dread such an occurrence and 77 (22.6%) remained neutral on the subject. Noted previously, the main assumption of the study was to establish whether the current Australian government's anti-terrorism campaigns were effective in the view of the general public. In the risk awareness (campaigns) category, participants were asked to give their opinion on the statement that: *Safety campaigns related to an Australian based terrorist act have made me more vigilant to the associated risks*. 212 (62.4%) of participants surveyed agreed with this statement, as compared to 46 (13.6%) participants who disagreed and 82 (24.1%) who remained neutral. Therefore, the survey results indicated that the current Australian government's anti-terrorism campaigns appeared effective in the view of the general public.

In the future generations' category participants were asked to respond to the following statement: *An Australian based terrorist act poses a high risk to my future generations*. The results indicated that 236 (69.4%) people agreed with this statement, as compared to 43 (12.6%) of people who disagreed and 61 (17.9%) remained neutral. The last statement in the survey asked participants to respond to the following question: *Current government regulation does not adequately control the risks from an Australian based terrorist act*. 129 (37.9%) participants of the total surveyed agreed that the current regulation was inadequate for today's terrorism threat, whereas 114 (33.5%) participants disagreed with this viewpoint and 97 (28.5%) participants remained neutral.

5.8 Study Reliability and Validity

The main study used three techniques to analyse reliability, namely Cronbach alpha reliability analysis, equivalence reliability measurements using Slovic’s (1987) study and peer review. Pearson's product moment correlation coefficient and Gussets t testing methodology was used to analyse the validity of the study.

5.8.1 Main Study Reliability Analysis

The main study yielded a highly reliable mean coefficient of $\alpha=0.7$ (S.D=0.00) for dread risk and a low to moderately reliable mean coefficient of $\alpha=0.38$ (S.D=0.84) for familiarity to risk. The familiarity risk reliability measurement was significantly lower than dread risk reliability in both the pilot and main studies, perhaps because not all participants surveyed were familiar with these types of risks. The reliability analysis of dread produced a reliability mean coefficient of $\alpha=0.7$ (S.D=0.00) compared to the pilot study’s reliability mean of $\alpha=0.76$ (S.D=0.6). Familiarity reliability analysis produced similar results, the main study recorded a reliability mean coefficient of $\alpha=0.38$ (S.D=0.08) where as the pilot study produced $\alpha=0.3$ (S.D=0.26) for its familiarity mean coefficient (Table 5.3). There was negligible overall difference between the pilot and the main study, which equated to 0.6 for the dread risk and 0.8 for familiarity risks between the two studies

RISK FACTOR	DREAD	FAMILIARITY
Microwaves	0.7	0.3
Appliance Fires	0.7	0.4
Coal Burning (Pollution)	0.7	0.4
Commercial Aviation	0.7	0.3
Terrorism	0.7	0.5
Mean	0.7	0.38
Standard Deviation	0	0.084

Table 5.3 Main Study Reliability Analysis - Scale (Cronbach Alpha)

In addition, reliability was achieved through equivalence reliability measurements based on a comparison of Slovic’s (1987) psychometric study. The main survey achieved a spatial quadrant match of 75% of the control items, namely microwave ovens, coal burning and appliance fires. The remaining control item of commercial aviation had decreased in the dread risk in both the pilot and main survey as compared to Slovic’s results. The results demonstrate the reliability and validity of the study’s techniques and research instrument used, as similar results would not have been achievable had these processes not been effective.

5.9 Pearson's Product Moment Correlation Coefficient

Pearson's product moment correlation coefficient (r) is a mathematical formula that is used to measure the correlation or association between two variables (See Section 4.6) and is rated from -1.0 through 0 to +1.0. Correlations of -1.0 represent negative weak linear relationships between the two variables, whereas a correlation range of +1.0 represents a perfect positive strong linear relationship between the two variables (Ployhart et al, 2006, p.55). For example a real world application of Pearson's product moment correlation is when "higher scores on mechanical aptitude tests are related to higher mechanical performance – a case of positive correlation. We also know that high job satisfaction is related to low turnover and [lower instances of] absenteeism – a case of negative correlation" (Koppes, 2006, p.55).

In the main study, Pearson's product moment correlation coefficient achieved a low to medium validity rating in the dread category and a low validity rating in the familiarity category (Table 5.4).

Factor	r	Standard Deviation
Microwave Dread	0.4	0.0803
Microwave Familiarity	0.1	0.0969
Appliance Fire Dread	0.3	0.1380
Appliance Fire Familiarity	0.2	0.1591
Coal Burning Dread	0.4	0.0725
Coal Burning Familiarity	0.2	0.1693
Commercial Aviation Dread	0.3	0.1060
Commercial Aviation Familiarity	0.1	0.1317
Terrorism Dread	0.4	0.1285
Terrorism Familiarity	0.2	0.1535
Overall Average Dread	0.36	0.0287
Overall Average Familiarity	0.16	0.0287

Table 5.4 Pearson's Product Moment Correlation Coefficient

5.10 Study Limitations

This study contained a number of additional limitations (See Chapter 4), which included the, Likert surveys, survey design and limitations with using the psychometric paradigm.

5.10.1 Likert Survey Limitations

There are a number of perception based limitations when using Likert surveys for social research. According to Kothari (1990, p.86) "Likert scales can only be used to determine whether a participant is more or less in favour of the topic and cannot measure the degree of their favourability or disagreement about a particular issue". Kothari further adds that participants in these types of studies may respond to questions based on how they perceive they should answer, rather than respond to the question based on how they feel about that particular subject. Finally participants cannot respond to Likert based perception questions in an appropriate valid manner without having prior experience in a real life situation. As Kothari (1990) maintains, real life experience and a perception of how one would react to a real life experience have little to do with each other. Despite these limitations Likert scales have been used successfully in many social perception based studies around the world, including Slovic's (1987; 1992; 1997) perception studies.

5.10.2 Survey Design

The study's pilot and main survey was redrafted a number of times in order to properly address underlying themes of the study. It was during this process in an effort to reduce acquiescent responding some of the survey questions were negatively phrased such as *Experts do not fully understand the risks associated with microwave ovens*. Many members of the public became confused when asked to respond to this question and many answered through haste that is they did not read the *do not* qualifier in the question and so answered the question as a positive. Other respondents did not understand the proposed question and so answered with a neutral statement. Due to the nature of the statement it is difficult to determine if the rest of the participants answered the posed question correctly, as such, it is unknown how the overall validity and reliability of the project was affected.

5.10.3 Psychometric Paradigm Limitations

The psychometric paradigm has been used around the world for many important social research studies, however as Sjöberg, (2006) will attest the model is not without its limitations. Sjöberg (2006) contests the basic tenets of the psychometric paradigm by pointing out that the psychometric paradigm was developed to address 1978 policy matters. These

policies were related to political attitudes such as nuclear policy and not necessarily public risk perception related to technological advancements. Risk is composed of two facets: probability and consequences, the probability of a negative event occurring has a close association with altering the public's perception of risk. It is however the political attitude that results in demands for risk mitigation, which is based on the severity of consequences of a negative event occurring (Sjöberg, 1999). It is this difference that Sjöberg maintains that the psychometric paradigm does not address.

Sjöberg and Drottz, (1987) assert that there is also a difference between personal and general risks. Personal risks are seen as either more or equally important as general risks whereas general risks are regarded as higher risks, especially if the risk is viewed as outside of a person's control such as nuclear power generation (Sjöberg, 2000a; 2000c; Mayo & Hollander, 1991). Applied to an individual's life style it was found that the general risks were seen as more important when addressing policy based issues. Therefore according Sjöberg, Slovic and his colleagues researched the wrong type of risk for policy based decisions, which limited the results of the psychometric paradigm (Sjöberg, 2003a).

In addition, there are other factors which cause limitations within the psychometric paradigm. One of these is the public's trust in a new technology, new or unknown technologies are often perceived by the public to contain environmental and or technology related hazards, especially if there is a perception the technology is lacking robust scientific assessment. Therefore, social trust of new/unknown technologies is not a strong factor when determining public risk perception which undermined the dread and familiarity core measurements in the psychometric paradigm (Sjöberg, 2001; 2004a; Renn & Rohrman, 2000). An additional consideration that was overlooked with the development of the psychometric paradigm was a common feeling by the public of a lack influence on important public policy decision-making which lead to alienation and rejection of the proposed policies. This lack of influence in turn affected the public's social trust regarding sensitive policy matters such as nuclear policy undermining possible research undertaken using psychometric paradigm model (Sjöberg, 1996b; 1997).

The variance of the perceived risk may also be considered a factor in particular, how novelty (familiarity) and dread in the psychometric paradigm measure the perceived severity of risk related consequences. Sjöberg argues that there is no evidence to propose that novelty is a factor in risk policy, attitudes or perceived risk and maintains the dread variable does not

wholly explained variance of the perceived risk either (Sjöberg, 2003b; Martinez, 2000). In addition emotions also play a key component when evaluating public based risk perception and indeed the word dread is a word linked with emotional overtones. Public attitudes and risk perceptions do have a moderately strong relationship between emotional reactions particularly, the affect heuristic, nevertheless it is how these facets are evaluated and measured that decides on whether they can be used as explanatory factors in resolving perceived risk (Drottz-Sjöberg & Sjöberg, 1990; Sjöberg, 1998).

The psychometric paradigm, when tested by Slovic, Fischhoff, & Lichtenstein, (1979), used only 15 experts whose expertise was considered dubious (Rowe & Wright, 2001) Their findings found that the link between the expert and lay people's perceptions of risk lacked true scientific evidence. Slovic et al (1979) results however, produced a marked difference between experts and the public, whereby risks that were tested were found to be in agreement with the current facts according the experts and in disagreement with members of the general public. To gauge whether this was current thinking in risk perception between lay people and experts Sjöberg conducted his own tests in risks pertaining to nuclear waste (Sjöberg, 2002) and genetic engineering (Sjöberg, 2004b). The end results of this study were that experts and lay people considered risk characteristics in a similar manner.

All testing and evaluation models have their limitations, but it is important to know the major limitations of the chosen research model. It is only by knowing the flaws in the model can mitigation methodologies be effectively used to overcome these limitations. To this end the study used non emotive questions in the survey, thus in part removing some of the emotional influence from the tested issues. However it is these same factors that are integral to understanding public and expert risk perception as *"Risk perception is all about thoughts, beliefs and constructs"* (Sjöberg 2000b, p.408). Therefore, risk and probability has a large degree of influence on a persons risk perception. It is for this reason the constructs of dread and familiarity within the psychometric paradigm correlated well to effectively gauge public risk perception within this study. Finally experts opinion was not used in this study only how the public perceived experts knowledge pertaining to particular risks.

5.11 Conclusion

This chapter presented a detailed analysis of the main study, in particular focusing on the study's background location and methodology. The study's demographic was examined, including a discussion on its gender and age demographics. Analysis showed that there were only two significant differences between the genders, in the familiarity category of coal burning and in the dread category of terrorism. Age group risk perception analysis showed that age had no bearing on how participants perceived risk and there were significant differences in both the dread and familiarity rankings across all five activities/technologies. However, the terrorism dread category did show a significant difference between ages 26-35 and 36-45. Spatial factor representation analysis was used to show dread and familiarity ranking ratios for all factors (Figure 5.1). This analysis showed the participants' risk perception of terrorism ranked second highest for dread and midrange for familiarity. There was a close match in results between the pilot and main studies, which potentially demonstrates a reliable and valid study.

Factor characteristic profiling used the main study results to demonstrate how each activity/technology interrelated with one another (Figure 5.2). In particular, it showed that participants did not believe experts understood the risks of terrorism, with this factor coming fourth out of the five activities/technologies. In the exposure category, terrorism ranked lowest indicating this was the risk that participants believed they would be least likely to know they had been exposed to. Terrorism however ranked the highest in the fatal consequences category and dread category. Participants believed that coal burning was a bigger threat than terrorism to their future generations. In the category of government control participants felt that more needed to be done to protect the public from the effects of coal burning than from a terrorism act.

Study reliability demonstrated that the main study yielded a high reliable ($\alpha=0.7$, $S.D=0.00$) mean coefficient for dread risk and a low to moderately reliable ($\alpha=0.38$, $S.D=0.084$) mean coefficient for familiarity to risk. In addition, equivalence reliability measurements based on a comparison of Slovic's (1987) psychometric study showed the study produced a spatial quadrant match of 75%. Similar results would not have been possible had the research instrument been unreliable. To analyse the study's validity Pearson's product moment correlation coefficient was used. This measure achieved a medium rating for validity in the dread category and a weak rating for validity in the familiarity category. As with all research

studies there were a number of limitations to consider including survey design, Likert survey limitations and limitations in using the psychometric paradigm.

CHAPTER 6

INTERPRETATIONS

6.1 Introduction

This chapter provides interpretations of the study, in particular the study addresses the two research questions and the one assumption based question. Each of these was resolved by using three study objectives. The first of these objectives was to examine; how recent terrorist events have impacted on the Australian public. The first objective was addressed by the study's research survey, in addition to a number of other research studies and public opinion polls. The second objective was to examine; how the current public perceptions of terrorism compared to other public risks in an Australian context. By using factor characteristic profiling and psychometric spatial factor representation techniques, the study was able to graphically demonstrate the current public perceptions of terrorism as compared to other Australian based public risks. The study's assumption aimed to establish if the Australian government anti-terrorism campaigns were effective in the view of the general public. This assumption was addressed within the study by using frequency analysis and factor characteristic profiling techniques.

6.2 Overview of the Interpretations

The study involved 340 participants who responded to a Likert survey involving five categories of risk, namely microwave ovens, appliance fires, commercial aviation and coal burning (pollution) and terrorism. Each risk category contained eight questions with eight underlying themes. These were expert understanding, fatal effects, immediate effects, known exposure, dread, observability (risk awareness), effects on future generations and government control. Using factor characteristic profiling, spatial factor analysis representation and frequency analysis techniques these eight key themes were analysed. The results of this analysis, along with other research results, were used to respond to the study's two research questions and its one assumption question.

Research Question 1

- How has recent terrorist events impacted on the Australian public;

Research Question 2

- How does the public's psychometric risk perception of terrorism contrast with other known risks?

Study Assumption 1

- Are current Australian government anti-terrorism campaigns effective in the view of the general public?

6.3 Age and Gender Demographics

The study used age and gender demographics to gain an understanding of individual and group trends. Gusset's t-testing methodology was used to analyse the study's results, which were then broken down into respective dread and familiarity based rankings. The end result of this analysis was that overall there was one real significant difference between the genders in the dread category, this result correlated to other psychometric based studies (Fischhoff et al, 1978; Slovic, 1987; 1992; Sjöberg, 2004). Age based demographics also produced unremarkable results, which suggests a diverse range of opinions on the issue of terrorism.

6.3.1 Gender Demographics

The noteworthy difference between the genders was found in the dread category on the subject of terrorism [$t(338) = 3.027, p=0.003$]. The results indicated that females dreaded a successful terrorism act more so than did their male counterparts. According to a number of studies (Fischhoff et al, 2003; Feldman et al, 2008; Goodwin et al 2005), one reason for this discrepancy between genders is that women respond to terrorism with higher levels of dread, personal vulnerability and emotional attachment then compared to males.

6.3.2 Age Demographics

The analysis of age demographics also found no real significant differences in all the study's activities and technologies. Newman and O'Brien, (2006, p.464) suggest that age based differences are a representation of the current prevailing social and historical conditions of today's society, thus what might be socially or morally unacceptable for one generation may be perfectly acceptable to another. Newman and O'Brien note that these differing cultural viewpoints inevitably influence how different generations perceive their place in the world. Terrorism is a sensitive subject and the age based demographics between the various age groups demonstrated a diverse opinion on this issue.

6.4 Research Question 1: How Has Recent Terrorist Events Impacted on the Australian Public?

6.4.1. Recent Terrorist Events their Impact on Australians.

Arguably the 11th September 2001 attacks on America have changed how Australians view their security within the world. According to McDougall, (2006, p.106) a number of key public perceptions were starting to emerge from this attack. The first of these is that recent terrorist related events in the Australasian region have altered the Australian public's perception on their own vulnerability, particularly to a fear that similar styled terrorist attacks would occur on the Australian mainland. Additionally the Australian public generally question, if the Australian government is capable of adequately responding to a 9/11 type of event. Finally in the aftermath of the 9/11 attacks and as a symbolic solidarity gesture Australia invoked the ANZUS agreement. It was feared that this action would lead to Australia's involvement in the American lead 'war on terror', which would ultimately put Australia military forces in harms way in both Afghanistan (2002) and Iraq (2003) (McDougall, 2006, p.106).

Domestic events further enforced the Australian public's perception of its vulnerability with incidents such as the MV Tampa affair on 24th August 2001 which further illustrated to the public the vulnerabilities of Australia's border protection program. The refugees who had hijacked the MV Tampa were mostly from Afghanistan, sections of the media and one federal government minister alleged that terrorists posing as refugees were trying to slip into Australia undetected. Illegal immigration of refugees via boats from the north were highly charged issues at the time. As both the Federal Government (who was trying get re-elected in the 2001 Federal election) and the general media highlighted the potential ramifications of terrorism in Australia, whose agents could come from these two sources (Reith, 2001).

Combined with these events was a sustained propaganda campaign by terrorist individuals and organizations, specifically mentioning Australia as a legitimate terrorist target. In addition there were several high profile terrorist attacks, which involved Australian citizens and assets, including: the terrorist attack in Bali (October, 2002), the attack on the Australian embassy in Jakarta (September, 2004) and more recently the terrorist's attacks on London's public transportation network (July, 2005) and Bali (October, 2005). Moreover for the first time Australians were becoming involved in both home grown and international terrorism. The events surrounding convicted Australian terrorist Jack Roche as well as David Hicks and

Mandou Habib, were also starting to become public knowledge (Department of Foreign Affairs and Trade, 2004a, p.p.11-73).

It was in this political and social climate that a growing perception of Australian public's vulnerability to the possibility of a terrorist attack occurring on Australian soil was starting to emerge. Australia's response to a 9/11 style type of attack and these other growing threats was to develop two national anti-terrorism frameworks, the first being the Transnational Terrorism: The Threat to Australia White Paper. This white paper examined how transnational terrorism affects Australia, its interests and its place within the region and the world. The white paper also presented a series of government initiatives that have been implemented to deal with specific Australian terrorism threats since the 9/11 attacks (Department of Foreign Affairs and Trade 2004, p.p.4-7).

The second document was the National Counter-Terrorism Plan (NCTP) which "outlines responsibilities, authorities and the mechanisms to prevent, or if they occur, manage acts of terrorism and their consequences within Australia. The NCTP will be updated as required and reviewed by the National Counter-Terrorism Committee (NCTC) at least every three years as part of the review of counter-terrorism arrangements" (Attorney Generals Department, 2005, p.1). These two documents have helped to outlined Australia's vulnerabilities in its national security architecture and some of the principal security improvements Australia has made since the 9/11 attacks are detailed in Table 6.1 (Appendix F).

These principal security improvements were put in place to protect the Australian public, nevertheless, how does the ordinary man or woman on the street feel about the threat of terrorism? One of the main objectives of the study was to examine how recent terrorist events have impacted on the Australian public. The main study involved 340 Participants who used a Likert survey to respond to a series of five risk categories each containing eight questions, using these results frequency analysis was undertaken on the study's key themes (Figure 2.1). This approach was undertaken in order to examine how the general public perceive the potential terrorism threat in Australia post 11th September 2001.

6.4.2 Terrorism and Public Exposure

By investigating how recent terrorist events have impacted on the Australian public, the study's first objective revealed a number of interesting results. Each of the five risk categories was analysed using psychometric spatial factor representation, factor characteristic profiling

and frequency analysis based techniques. The results found that there were a number of key impacts on the Australian public. The study results offer an insight into the diverse nature of the public's perceived risk of terrorism. Participants were asked their opinion on this statement: *'I know when I am exposed to the risks associated with an Australian based terrorist act'* 30% of participants agreed (N=103) that they would be aware if they were at exposed to risks from a terrorist act as was compared to 40% (N=136) who believed that they would be unaware of their exposure to this risk. The perceived risk of exposure is a main component in social research in understanding how the general public identify personal or group based threats.

Sjöberg (2004c) published a paper entitled "The Perceived Risk of Terrorism", whose purpose was to understand what social factors influenced people's perceived risk of terrorism. He used a number of tools to achieve this including: Swedish and American opinion polls on terrorism, the psychometric paradigm, the theory of the social amplification of risk and Sjöberg own survey of 294 members of the Swedish public. Sweden is also similar to Australia in that it has not experienced a direct terrorist act on its soil for more than 30 years (Griset & Mahan, 2002, p.174). Sjöberg's study found that the perceived risk of terrorism in Sweden was very low. He also found that collective perceived community risk of terrorism was rated higher than the perceived individual risk of being involved in a terrorist event. According to Sjöberg (2004c), this "suggests a relatively high level of perceived possibility to protect oneself against this hazard." (Sjöberg, 2004c, p.1),

According to the Human Rights and Equal Opportunity Commission (HREOC) (2008; Howie, 2005) there has been increase in discrimination of Muslim cultures in Australia. Discrimination practices include: negative comments about Muslim names or dress codes, racial vilification, threats of violence and or actual violence. Other discrimination practices reported by HREOC related to restrictions in the practice of cultural or religious beliefs such as employers refusing to allow prayer breaks and enforcement of work place dress codes. Philips (2007) states that Muslims experience discrimination along three key themes:

1. Muslim Australians are potential terrorists;
2. There is no place in Australia for Muslims;
3. Muslims should abandon their cultural practices and 'assimilate.'

Whitten and Thompson (2007) assert that Muslim women and children feel that they are particularly vulnerable as they feel they do not belong in the public domain. This fear was often verified from both physical abuse and passive forms of discrimination such as staring from members of the general public. These forms of discrimination led to increased apprehension, fear and dread when moving about in public space and recent research by Aly et al (2007) confirmed Whitten and Thompson findings. Using a metric of fear scale based on Gordon and Riger's (1979) fear of rape scale, the researchers were able to demonstrate the nature and extent of the dread of terrorism operating within the Australian and Muslim community since the September 11th 2001 terrorist attacks.

Dread was also a major factor in this research study. Participants were asked to respond to the following statement: *'On a gut reaction, I dread the risk from an Australian-based terrorist act.'* 60% (N=205) agreed that they did dread this type of risk as compared to the 17% (N=58) who disagreed with this statement. Similar results were found by a public poll conducted by Megalogenis (2008), where participants were asked: *'How concerned are you that there will be a major terrorist attack on Australian soil in the near future?'* 66% of participants responded that they were concerned about such a possibility occurring. These studies indicate that Australians are still concerned about an Australian-based terrorist act occurring.

The latest 'Survey of Social Attitudes' conducted by the Australian Institute of Criminology found that many Australians still dreaded the possibility of a terrorist act on Australian soil, confirming both Megalogenis' and the author's findings. The biennial study examined how Australians perceive the current status of crime and justice in Australia and around the world. It found one third of Australians surveyed, feared that a terrorism attack would occur in Australia during 2008. On an international basis, three quarters of those surveyed cited South-East Asia as the most likely region for a terrorism based attack. Furthermore, the survey also revealed one out of eight Australians believed terrorism was the main problem that faces Australia today (Australian Institute of Criminology, 2007).

Aly et al (2007) however, found that the risk of a terrorist attack in Australia is minimal compared to other mortality risks such as smoking and car accidents. However, the dread of being attacked changed the participants' behavioural patterns, such as avoiding public transport or popular attractions. Participants also displayed a heightened level of awareness of their general surroundings. The researchers found that as with fear of crime studies, results differed amongst gender, income and educational level; however participants from a Muslim

background showed far higher dread ratings as compared to the general community. In addition it was the Muslim community's sample that demonstrated higher personal protection behaviours. This type of behaviour was due to the perceived impact from a terrorist attack and its ramifications to them and their community from the general public, rather than the perceived risk of an actual terrorist attack occurring.

6.4.3 Public Perception of Terrorism: Immediate Effects

Participants in the research study were however split on whether *'the effects of being exposed to an Australian terrorist-based act are known immediately.'* Out of 340 participants, 38% (N= 129) agreed as compared to 39% (N= 132) who believed the effect would be delayed. 23 % (N=79) remained neutral in responding to this statement. The most publicised terrorism acts are those bomb based attacks such as the Bali, Madrid and London attacks, with modern media coverage techniques streaming footage around the world within minutes of the attack occurring. However, it could also be argued that other terrorist incidents are committed which are not immediately known at the time, including cyber attacks and threats to food and water security (Queensland Environmental Protection Agency, 2002; Food and Drug Administration; 2005; United Nations, 2001). These recent types of terrorism acts may account for the almost equal split in opinion amongst participants. As the study was intended to be generic in nature, respondents were given ample scope to encompass a range a threats, it is however, difficult to know exactly why one participant responded for and another against when responding to this statement.

6.4.4 Terrorism and Fatal Effects

The Australian public opinion was clear when participants were asked to respond to the following statement: *'Exposure to the risks of Australian based terrorist act could seriously damage my health'*. As 74% (N=253) participants agreed that possible exposure to the risks of an Australian based terrorist act could seriously damage their health. Whereas 10% (N=33) participants disagreed. 16% (N=54) of participants remained neutral. In 2005 a time when both the Iraq war and the coalition's war on terror campaign in Afghanistan was well under way, an Australian researcher Howie (2005) conducted a qualitative research study into five organisations in inner city Melbourne (legal, financial, administrative and two retail based sectors) based on the public's perception of terrorism and the workplace. Howie's study focused on whether there was any significant discrimination in the workplace, the affect of employee related occupational stress and how the each company's culture changed from the perceived exposure to an Australian based terrorist act (Howie, 2005, p.2).

Howie (2005) demonstrated that despite there being no specific terrorist threat to Australia at the time, many people perceived there was a threat when at work. Howe's study discovered that fear and distrust lead to significant levels of discrimination and apprehension when employees were dealing with Muslim based cultures. Across Howie's study discrimination and workplace diversity in many instances resulted in employee related conflict, poor service and decreased levels of job satisfaction. Howie found that substantial work related stress and decreased job related performance could be attributed, to unsubstantiated perceptions that Muslim cultures would carry out a terrorist act. One factor that may have added to these increased stress levels was the 7th July 2005 London bombings, as employees also felt that they were no longer safe commuting to work by rail or bus networks (Howie, 2005, pp.3-8).

Respondents across Howie's study reported increases in occupational stress attributable to their perceptions of the terrorist threat. This was demonstrated in one case at a retail firm where there was a power outage that resulted in a workplace wide blackout and the activation of an alarm. The resulting panic lead to yelling, screaming and general apprehension that a terrorist event had occurred. Following the aftermath of this event respondents reported a reduction in job satisfaction, motivation and willingness to attend work. The perceived threat of terrorism in Howie's study lead to increased levels of occupational stress, decreased levels of job satisfaction, increases in general fear and apprehension. In some instances increases in levels of intolerance, irrationality and hyper dread when dealing with Muslim or Arab based cultures was also present (Howie, 2005, p.8). This study confirmed Howie's findings that Australians do not fear terrorism but do dread its occurrence.

One recent Australian study undertaken by the University of Western Sydney's (SciMHA) (Science, Mental Health & Adversity) Unit demonstrates that there are also a number of mass psychosocial based effects that can harm a persons health from a fear of terrorism (Stevens, 2007). These relate to increases in stress levels from a belief in exposure to a terrorist act, which can lead to anxiety-related disorders including post traumatic stress disorder, which can result in increased alcohol or prescribed / illicit substance abuse causing further harm. In some cases chronic psychological based disorders can also result which can require extensive psychiatric counseling and prescribed medications for the subject to feel more at ease with the world around them (Stevens, 2007). It can now be seen that exposure to an Australian terrorist act does not have to occur to threaten the public's health; just the perceived threat of being exposed is enough to increase levels of dread amongst the general public.

6.4.5 Terrorism Risks to Future Generations

The study asked participants to respond to the following statement: '*An Australia-based terrorist act poses a high risk to my future generations.*' 31% (N= 136) of the study's participants agreed that there was a significant threat to their future generations from this risk. The impact of a terrorism act on Australia's future generations can be viewed in two contexts; the first is being directly involved in the attack, where a family member is lost causing grief and loss for the survivors. The second impact occurs from more of an indirect association. As Australia is a multicultural based society many Australians have strong links back to their mother countries. Terrorism or other war related events that happen in other regions can have a direct impact on ordinary Australians as belligerents on both sides of the conflict voice their concerns, react emotionally and sometimes violently to the current crisis or long term historical grievances.

One example of this occurring is in sport, particularly soccer whereby nationalities will support their team enthusiastically sometimes to point of violence on the opposition's supporters. In many cases these are organised gang related events, but just as often they are heat of the moment type of incidents whereby ordinary members of the public are often unwillingly caught in the middle of the two sides (Szymanski & Zimbalist, 2006, pp.77-83). Another example is the publication in September 2005 and the subsequent republication in February 2006 of a number of Muslim targeted cartoons by Danish newspaper Jyllands-Posten (Dawkins, 2006, pp. 24-27).

In response to these perceived insults and in the perceived defence of their faith, hundreds of thousands of Muslims protested around the world. These protests lead to riots which resulted in at least 139 fatalities, 823 injuries and an untold amount of damage not only on Danish interests but to Western businesses and embassies as well. A number of terrorist leaders around the world issued death threats to various editors who printed or reprinted these cartoons. A number of terrorists through out the world used this event as a pretext to plan a number of terrorist attacks of which most were prevented. The offending cartoonists are under death threats even today (Spencer, 2007, p 145).

One final example of nationalism is in displays of patriotism which lead to violence against other nationalities or ethnic races. On 11th December 2005 Australians saw this side of nationalism first hand, when the Cronulla riots in Sydney between Australians and other various ethnic nationalities went from an isolated incident to a much wider conflict. This event

resulted in innocent people being injured and property being damaged in the aftermath of the initial riot (O'Sullivan, 2006). It can now be seen that while a direct terrorist act would cause significant harm to Australia's current and future generations, equally as important are indirect terrorist related actions and long lasting historical or cultural grievances which also pose significant harm to ordinary Australians.

6.4.6 Governmental Regulation and the Control of Terrorism

A 2005 poll conducted by Morgan and Levine, (2005) found terrorism is a significant risk to ordinary Australians. Respondents were asked: *"What do you think is the most important problem facing Australia is today?"* 21% of those polled believed that terrorism, war and Australia's security were the most important problems facing Australia at the time. On this issue of whether the government is doing enough to control the terrorism threat, the majority of Australians (54%) believe that the Australian federal government is doing enough to control the threat of terrorism in Australia (Morgan & Levine, 2005, p.p. 1, 5).

More recently in his speech at the Queensland Regional Heads Forum in 2007, Robert Cornall the Secretary of the Attorney-General's Department gave his thoughts on two recent public opinion polls, regarding the Australian government's laws relating to controlling the threat of terrorism. The first poll was conducted by the Unisys Security Index in 2006 and found that 52% of Australians or around 8 million people are either very or extremely concerned about Australia's national security in relation to terrorism. Cornall stated that this figure had increased by 1.7 million from polls of the previous quarter (Cornall, 2007).

The second poll was conducted in September 2006 by the ACNielsen/Age group. This poll found that "Almost two in every three Australians believe the world is less safe than it was before the September 11 attacks in the US... and half believe a terrorist attack in Australia is more likely than it was in 2001." In the same poll respondents were also asked what they thought about the federal government's legislation which restricts civil liberties in response to the threat of terrorism. 49% believed the Howard Government had shown about the right amount of respect for civil liberties, 29% believed the Government had not shown enough respect, and 15% thought the Government had shown too much respect" (Cornall, 2007).

Cornall responded to these civil liberties criticisms by saying "I think we can say with some confidence that there is a general [public] consensus that these laws are necessary and appropriate to meet the terrorist threat we now face, despite the objections of a vocal

minority” (2007). The research study also found public opinion was equally divided in regard to government control of the terrorism risk. 34% (N=114) of participants believed ‘*current government regulation adequately controlled the risk from an Australian based terrorist act*’, compared to 38% (N=129) who thought they could do more. The divided opinions on this issue may relate back to public opinion with Australia’s role in the war on terror and Australia’s increased world profile. Many Australians believe that due to our efforts in combating regional and international terrorism, Australia is now at risk from a terrorist attack. Cornall however believed that the current terrorism legislation was necessary and appropriate at this stage to meet Australia’s anti-terrorism needs (Cornall, 2007).

6.5 Research Question 2: What is the current public perception of terrorism as compared to other public risks in an Australian context?

Factor characteristic profiling was used to analyse how the current public perceptions of terrorism compared to other public risks in an Australian context (Figure 6.1). The technique was used to graphically display how each activity or technology interrelates to one another. The study used this information to profile each of the five activities or technologies into their respective dread and familiarity ratings (Section 5.5 Main Study Factor Characteristic Profiling).

The current public perception of terrorism was a divisive topic as was seen in the category of expert understanding where, participants were asked to give their opinion to the following question: *Experts do not fully understand the risks associated with an Australian based terrorist act*. In response to this statement 119 (35%) of the participants agreed, whereas 151 (44.4%) of participants disagreed, with the remaining 70 (20.6%) neutral in their response. The data indicated that the Australian public perceived that experts did not fully understand the risks associated with terrorism. There were several other key findings in this study such as; the public’s perception of exposure to risks associated with terrorism was deemed to be an unknown threat. Whereas the immediate effects associated with a successful terrorist event were considered to be a more of a moderate risk.

The Australian public also viewed anti-terrorism based safety and awareness campaigns to have a high level of observability. Likewise, most Australians believe that there is a high level of risk which could produce fatal consequences if exposed to a terrorist act. Furthermore many Australians surveyed also had a high degree of dread from the possibility of an Australian based terrorist act occurring. According to many of the participants surveyed, the future

effects of a terrorism attack are moderate to high. Finally in the issue of government regulation to control terrorism, Australians only have a moderate amount of confidence in the government's anti-terrorism efforts to date.

6.5.1 Spatial Factor Representation

The study used psychometric spatial factor representation to examine the interrelationships between each of the variables that were used in the study. The study demonstrated that the risk of terrorism had a high dread rating (Mean=2.36) and a moderate familiarity rating (Mean=2.90) when compared against the other four control based activities and technologies (See Figure 5.1). The risk of terrorism occupied the same spatial quadrant (top right) as coal burning, with the public viewing the risk of coal burning as the most serious threat to their health and safety. Coal burning had both the highest dread rating (Mean=2.30) and the third highest familiarity rating (Mean=2.93) of the entire study. The result reflects a recent Lowly Institute annual poll that surveyed the Australian public opinion on foreign policy and global affairs. Climate change was the cause for the most concern, with 55% of those polled very worried about its effects, as compared to 38% of people who were concerned about the threat to Australia from international terrorism (Lowly Institute for International Policy, 2007, p.1).

6.6 Study Risks and Terrorism

"Clean air is considered to be a basic requirement of human health and well-being. However, air pollution continues to pose a significant threat to health worldwide. According to a WHO assessment of the burden of disease due to air pollution, more than 2 million premature deaths each year can be attributed to the effects of urban outdoor air pollution and indoor air pollution (caused by the burning of solid fuels)." (World Health Organization, 2005, p.5). Pollution from the burning of solid fuels such as coal was also highlighted, as a major cause for concern for participants who undertook the study's survey. This was highlighted in the main study's factor characteristic profiling table (Figure 6.1), which demonstrated on the basis of dread terrorism ranked the highest risk (Mean=2.34, S.D=1.139) in the study, closely followed by risks associated with coal burning (Mean=2.62, S.D=1.001).

In Australia in 2005 to 2006 passengers that flew on international services reached 21.1 million, in the same period passengers traveling on domestic and regional regular public transport services totaled 41.9 million (Bureau of Transport and Regional Economics, 2007, p.4). Most people in the study viewed the commercial aviation risk as a low dread (Mean=3.06) with a high familiarity (Mean=2.97) rating, which placed this control in the top

left of the spatial quadrant map. Recent Australian statistics reflect these findings, from 1998 to 2007 in the high capacity air transport sector (Qantas, Virgin Airlines etc) there were 21 accidents with no fatalities. In the same period in the low capacity air transport sector (SkyWest, JetStar Airlines etc) there were 21 accidents and 2 fatal accidents, which occurred in 2000 and 2005, these accidents resulted in a total of 23 fatalities (Australian Transport Safety Bureau, 2007, p.1).

A recent safety report by Newman, (2006) demonstrated that the risk of an in flight medical event or injury on commercial aviation flight was relatively low. In the study period there were 284 occurrences in which passengers developed an in flight medical emergency or sustained an injury of these 15 were classed as accidents, 1 was considered a serious accident and 268 were considered incidents. Newman's figures can be further analysed in highest injury counts, of the 284 occurrences there were 9 fatalities, 100 serious injuries and 150 minor injuries, 25 of these incidents were not specified (Newman, 2006, p.p. 5-8).

Comparing the risks of commercial aviation with terrorism risks from Appendix B, Table 1.1 we find in the same 32 year period, terrorism risks resulted in 3140 fatalities and 3899 injuries as compared to 9 fatalities and 254 incidents or accidents which resulted in injury in commercial aviation. The results are not softened if the 9/11 attack was disregarded, as there were still 389 fatalities and 1638 injuries caused by terrorism during same period. Terrorism is therefore is a much more significant risk to the public than is travel via commercial aviation. One final finding of the study was that commercial aviation fatalities and injuries are not widely reported in the mainstream media, which may also account for the public's low dread perception of the risks relating to commercial aviation.

Statistical analysis of the study revealed that microwave ovens were perceived by the public to have the lowest dread rating (Mean=3.08) and the highest familiarity rating (Mean=3.13), this places this control group in the top left of the spatial quadrant map. Microwave ovens have been used for over 20 years and have undergone extensive scientific testing and have to date been associated with 3 hazards. These are electrical hazards (electrocution and electrical interference), burns and extensive microwave leakage which have been known to cause serious health effects such as deep tissue burns. The most serious hazard of electrical interference in modern medically related implants such as cardiac pacemakers is not likely today, as leakage levels are within the recommended manufacturer limits (Australian Radiation Protection and Nuclear Safety Agency, 2006).

Microwave ovens are technically safe but have been known to cause burns and scalding to babies, children and adults alike, mostly from the overheating of both food and liquid products (Food Science Australia, 2005). Non food related items such as grain filled heat packs used in medical therapy and warmth during the winter months have also been a fire risk (Australian Therapeutic Goods Administration, 1998, p.7). Other hazards related to microwave ovens are incorrect or deliberate use/misuse, superheating and sealed containers, which have the potential to cause serious injury. Due to the low risk when correctly using a microwave oven there is no equal comparison to terrorism based risks.

A final risk in the study was appliance fires, according to the Australian Fire and Emergency Service Authorities Council, (2006, p.2) there were 99,965 total fires in 2005/2006 in Australia of these there were 19,406 building fires of this total 904 of these were caused by appliance fires (Note: Injury and or fatality figures were not available). Given these figures however the general public is not much more at risk from injuries/fatalities related to the risk of appliance fires than they are from an act of terrorism (See Appendix B). Furthermore the public's perception of low dread and familiarity ratings of appliance fires may also be attributed to the public's safety awareness of the common causes of appliances fires and may result in their relatively low risk of occurring. Finally the study achieved a 75% equivalence reliability measurement rating based on a comparison of Slovic's (1987) psychometric study. The closeness of the results between the pilot and the main study illustrates the effectiveness of the research instrument in terms of reliability and validity, as similar results would not have been achieved if the instrument was not effective.

Compared to Slovic's (1987) results the study achieved generally higher familiar ratings across the board with the only exception being appliance fires in the main study. In terms of dread however the differences between this study and Slovic's results were that coal burning and appliance fires had a dread higher rating. A general increased public knowledge of the study's risks, various scientific advancements and availability of risk reduction technologies since Slovic's (1987) study may account for differences in dread and familiarity results between the two studies.

6.7 Assumption 1: Are current Australian government anti-terrorism campaigns effective in the view of the public?

The study's assumption was to gauge how effective the Australian anti-terrorism campaigns such as the current *National Security Every Detail Helps, 2007* campaign was in the view of the general public. A 2007 Lowy Institute poll of 1003 Australians asked '*How worried are you about potential threat of international terrorism from the outside world?*' 68% of those surveyed were either very worried or fairly worried. Despite these results, only 5% of participants thought fighting terrorism should be a priority for Australia, compared to 28% who thought standards in education and tackling climate change respectively should be the priority (Gyngell, 2007). The low figure may represent the public's perceived safety and security in the current climate.

Factor characteristic profiling and frequency analysis of this study supported the Lowly Institute's poll findings. The study demonstrated, the general public perceived safety campaigns about terrorism (Mean=2.38, S.D=.954) as the most effective, as compared to the other activities or technologies. Frequency analysis of participants responses to the study's survey question; '*Safety campaigns related to an Australian-based terrorist act have made me more vigilant to the associated risks*' demonstrated that 62% (N=212) of participants perceived that the current government anti-terrorism campaigns are effective.

Young (2007, p.224) states that the measurement of tourist campaigns can be easily assessed by evaluating customs data on the increases or decreases in numbers of people visiting a country. Likewise, road safety campaigns can be measured by investigating statistics from the main roads department. Using these results a person can determine the effectiveness of a particular safety initiative or campaign. According to Young (2007) in contrast measuring the effectiveness of anti-terrorism campaigns can be exceeding difficult, this is primarily due to the campaign aims which include raising awareness and providing reassurance (p.224).

Such aims are difficult to measure, even more so when the government for national security reasons refuses to publish all of the campaign statistics. One method that can be used to gauge the government's anti-terrorism campaign effectiveness is by a response rate from members of the public. According to the Attorney-General's Department (2008) the national security hotline has received over 93,000 calls, letters and emails from members of the public since its inception on 27th December 2002. The study also demonstrated that 62% (N=212) of participants also believed that the Australian government anti-terrorism campaigns are effective. These results combined with the national security hotline statistics, may provide

some degree of assurance that these campaigns are both effective and worthwhile in curtailing domestic terrorism.

6.8 Conclusion

The chapter presented a detailed interpretation of the study's results with the key to the study being the measurement of the public's social risk perception of terrorism. This social risk perception measurement was used in addressing the study's two main objectives and one assumption based statement. Slovic's psychometric paradigm graphically demonstrated key aspects of interrelations amongst the five activities and technologies used within the study. Factor characteristic profiling was also employed to analyse how the current public perceptions of terrorism compared to other public risks in an Australian context. The study's reliability and validity of the project was ensured by using a number of specifically tailored research tools.

Gusset's t-testing methodology demonstrated that there was one significant difference between the genders, namely in the dread category for terrorism [$t(338) = 3.027, p=0.003$]. Research has shown that women respond to terrorism with higher levels of dread, personal vulnerability and emotional attachment when compared to males (Fischhoff et al, 2003; Goodwin et al 2005; Feldman et al, 2008). These results correlate well to other psychometric based studies (Fischhoff et al, 1978; Slovic, 1987; 1992; Sjöberg, 2004) who have found similar findings. Analysis of age demographics found only one significant difference in the terrorism dread in the 26-35 to the 36-45 age range. No other significant differences in age groups were found within the study. One reason for this discrepancy is that terrorism is a very divisive issue amongst various cultures. Newman & O'Brien (2006, p.464) suggest that these differences in age might be subjective to exposure to prevailing social and historical conditions; these collective cultural and social viewpoints inevitably influence how different generations perceive their place in the world.

The study also illustrated how various social changes have contributed to how people perceive their own security in the world. According to Howie (2005) and Aly et al (2007) it was the media's sensationalisation of the Bali, Madrid and London bombings which has led to widespread discrimination of Muslims within the Australian community. This discrimination has resulted in significant cultural changes which have increased levels of occupational stress, intolerance, irrationality and hyper dread among both muslims and non Muslims alike. To allay community fears the federal government introduced a raft of new anti-terrorism based laws

(See Appendix A). These laws required additional scrutiny of the general public and have changed the way we now post mail, pass through airport security, obtain and use passports, view/process refugees and migrants and report in the general media about sensitive issues regarding terrorism.

CHAPTER 7

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

7.1 Introduction

This concluding chapter presents a detailed overview of the study, including its background, research and study results. The 11th September 2001, (9/11) was the day when the entire world took notice of the risks of international terrorism. Ten Australian citizens lost their lives to this one event, additionally far reaching ramifications were also felt in legal, political, economic and military arenas, along with a shifting in Australia's security and social landscape (Department of Foreign Affairs and Trade, 2004b). The ensuing international and domestic fallout from this event continues to this day. The invocation of the ANZUS agreement has led Australia, along with its coalition allies, to a global, long term, multi-faceted war against various terrorist organizations throughout the world (Nelson, 2006).

7.2 Summary of the Study

For the Australian public, the main impact of 9/11 and other subsequent terrorist acts such as the Bali bombings, was an increase in awareness, anguish and community concern regarding a terrorist act occurring on mainland Australia. The Australian Government's response was to implement public awareness anti-terrorism campaigns, commencing in late 2002. The aim of these campaigns was to increase the public's awareness of their general surroundings and to promote the reporting of suspicious activities to a 24-hour national security hotline (Attorney-General's Department, 2007a). These campaigns also relayed to the public, the importance of the increased security measures and the implementation of sometimes controversial legislation (Attorney-General's Department, 2007b).

In Australia restricted research has been carried out on public social risk perception and psychometric social studies in regards to terrorism. The study aimed to address this limitation by focusing on the social and security repercussions on Australia post 9/11. This aim was achieved through using research obtained from Australia's anti-terrorism campaigns, a literature review, previous anti-terrorism studies and a Likert based research study of Western Australian public's perceptions of terrorism. Material was sourced from the Australian public in addition to government statistics, research papers, official trends from private sector surveys, various academic books/journals, and university and other internet databases. One of the primary research questions for the study was "*How have recent terrorist's events impacted*

on the Australian public? The study's other main research question was "*How does the public's psychometric risk perception of terrorism contrast with other known risks?*" These research questions were addressed based on the following two objectives and one assumption:

- To examine how recent terrorist's events have impacted on the Australian public.
- To examine the current public perceptions of terrorism compared to other public risks in an Australian context.
- Utilizing a 5-point Likert based questionnaire, establish the effectiveness of current Australian government anti-terrorism campaigns in the view of the Western Australian public.

The study's underlining framework was the psychometric paradigm, essentially a 'cognitive map' which is used in social risk perception research. The paradigm is broken down into two axis, namely Dread Risk (Factor 1) and Unknown or Familiar Risk (Factor 2). Combining these two axis, a map of the public's risk perception of known and unknown hazards with their corresponding dread levels can be developed. This type of information can be used by policy makers to ensure high dread-based risks carry increased legislation requirements and controls to reduce the public's potential to exposure. Slovic (1992, p.120) sums up the psychometric paradigm as:

"A theoretical framework that assumes that risk is subjectively defined by individuals who may be influenced by a wide array of psychological, social, institutional, and cultural factors. The paradigm assumes that, with the appropriate design of survey instruments, many of these factors and their interrelationships can be quantified and modelled in order to illuminate the responses of individuals and their societies to the hazards that confront them".

The literature review provided an in depth account of psychometric origins and examined how key researchers have played a role into developing the science of psychometrics that is still in use today. In addition, supporting concepts such as risk perception were also examined, specifically their role in relation to psychometric theory and various factors used singularly or combined that will have varying degrees of bearing upon an individual's risk perception and behaviour towards a particular risk. These factors include the scale of the event, an individual's personal control, the media attention assigned to the event, factors relating to an individuals voluntariness of being exposed, dread, expert knowledge of consequences, average

numbers of individuals affected each year and finally whether certain age groups are affected (Slovic, 1992).

The primary controls were taken from Slovic's (1987) psychometric study entitled "Perception of Risk". The study was based on how the American public perceived 81 different technologies and activities. The study's controls used four out of these 81 activities and technologies and were taken from each quadrant of Slovic's psychometric paradigm. The study controls were microwave ovens, coal burning (pollution), appliance fires and commercial aviation. The controls were chosen because they were considered activities and technologies that the general public would be familiar with. This was important as dread and familiarity ratings would be critical to analyse public risk perceptions. Each activity/technology comprised of the same eight questions which were based on a different underlining theme, namely expert understanding, fatal effects, immediate effects, known exposure, dread, observability, effects on future generations and government control.

7.3 Study Results

The main study was conducted in the same manner as the pilot study, with a larger sampling population of 340 participants and was conducted at the bus and taxi ranks of Centro Warwick Shopping Centre. Limitations in this study included; the expertise of the researcher, the nature of risk, the study's research design and methodology, in addition to limitations directly associated with Likert surveys. Reliability analysis using Cronbach's Co-efficient Alpha Test showed a highly reliable mean coefficient of $\alpha=0.7$ (S.D=0) for dread risk and a low to moderately reliable mean coefficient of $\alpha=0.38$ (S.D=0.84) for familiarity to risk. Equivalence Forms Reliability Measurement was used based on a comparison of Slovic's (1987) psychometric study. The main study achieved a spatial quadrant match of 75%, namely in the study's controls of microwave ovens, coal burning and commercial aviation. The validity of the main study was analysed using Pearson's product moment correlation coefficient and achieved a moderate to strong linear strength rating for validity in the dread category and a weak linear strength rating for validity in the familiarity category.

Demographics of the main study were also analysed using Gusset's t-testing methodology. There were only two significant differences between the genders in the main study. These were in the familiarity category of coal burning [$t(338) = -2.126, p=0.034$] and in the dread category of terrorism [$t(338) = 3.027, p=0.003$]. T-testing of age groups, however demonstrated multiple significant differences and risk perceptions across all of the study's

activities/technologies. Spatial analysis representation was used to illustrate trends between all activities/technologies, based on dread and familiarity rankings toward each category. The results demonstrated that the public's perception of terrorism was second highest in terms of dread and ranked midrange in terms of familiarity, which seemed to indicate the impact of Australia's long term high profile anti-terrorism campaigns.

Indeed, frequency analysis showed that 62% of participants were aware of these anti-terrorism campaigns. However, the main study also found that the participants dreaded the risks from coal burning more than they dreaded a terrorist act. The next most concerning dread risk for the general public was appliance fires, followed by commercial aviation and microwave ovens. In terms of familiarity the study showed that appliance fires were the least familiar risk followed by terrorism, coal burning, commercial aviation and lastly microwave ovens.

Factor characteristic profiling was used in the main study to demonstrate how each activity/technology interrelated to one another based on the study's main underlying themes. Furthermore risks that were deemed significant ≥ 0.6 were further analysed to gain a greater understanding of how the public perceived risks. The immediate effects of terrorism (Mean=2.97, S.D=1.132) were not of such a concern to the public when compared with the greater perceived risks of commercial aviation's immediate effects (Mean=2.92, S.D=.981) or appliance fires (Mean=2.50, S.D=.970). In the observability, or safety campaign category, the ongoing anti-terrorism awareness campaigns (Mean=2.38, S.D=.954) ranked the highest of all activities/technologies.

In terms of dread, terrorism was the most feared risk (Mean=2.34, S.D=1.139), followed by coal burning (Mean=2.62, S.D=1.001), appliance fires (Mean=2.92, S.D=1.131), commercial aviation (Mean=3.15, S.D=1.016) and finally microwave ovens (Mean=3.54, S.D=1.031). The future effects category demonstrated that the public perceived coal burning (Mean=2.06, S.D=.959) rather than terrorism (Mean=2.15, S.D=1.050), as a greater concern for their future generations. Finally in the government control category, terrorism (Mean=2.91, S.D=1.156) came second only to coal burning (Mean=2.39, S.D=.967) and indicated that the public thought that Australian Government was not doing enough to control this particular risk.

7.4 Research Question 1

How recent terrorist's events have impacted on the Australian public?

Although Australia has not had a successful terrorist act on its soil recently, government reports have shown that Australia, its citizens and its ministers have all been singled out in terrorist propaganda. (Department of Foreign Affairs and Trade, 2004a, p.66). Terrorism based risks such as water, food and chemical, biological, radiological and nuclear security are now the focus of government reforms and legislation. The Australian government now has a more active role in the regional arena as well, to use its resources to prevent actualisation of a terrorist act. This is significant as Australia depends on its regional neighbours for its own operational effectiveness in both national maritime and border security environments (Attorney Generals Department, 2007).

Domestically Australians are acutely aware of terrorism risks with up to 30% (N=103) of those surveyed believing that were at risk of being associated with an Australian based terrorist act. Dread was a major factor within the study and was reflected in the study's survey with 60% (N=205) of participants still dreading the risk from an Australian-based terrorist act. Significantly these results reflected the results of other dread based studies such as Megalogenis 2008 study. Participants were however split on immediacy of the effects of an Australian terrorist-based act as 38% (N= 129) agreed that they would be aware, compared to 39% (N= 132) who believed that any terrorism based effects would be delayed.

The Australian public opinion was clear however in the response to the fatal effects of terrorism category. As 74% (N=253) of participants agreed, that possible exposure to the risks of an Australian based terrorist act could seriously damage their health, compared against 10% (N=33) of participants who disagreed with this assessment. Recent research undertaken by the University of Western Sydney's (Science, Mental Health & Adversity) (SciMHA) unit also demonstrated that there were a number of mass psychosocial based effects that can harm a person's health from a fear of terrorism. These effects included changes in organisational culture which include significant increases in occupational stress and even post traumatic stress syndrome (Stevens, 2007; Howie 2005).

These results demonstrated that an Australian terrorist act does not have to occur to threaten the public's health as just the perceived threat of being exposed is enough to increase levels of dread and thus potential harm amongst the general public. One causal link from the study was that Muslim cultures particularly amongst women found higher levels of dread and

discrimination both in public and the workplace since 2001 (Howie, 2005; Whitten & Thompson, 2007; Philipps, 2007).

On the issue of whether an Australia-based terrorist act poses a high risk to future generations 69% (N= 136) of participants believed that terrorism did pose a high risk to their future generations as compared to 13% (N=43) of the study's participants who believe it did not. Subsequent investigation revealed that participants were indeed at risk due to nationalist based long lasting grievances relating to sporting, war related or terrorism based events. In the right circumstances each of these posed significant harm to both current and future generations of ordinary Australians. The study also found public opinion was almost equally divided in regard to government control of the terrorism risk. As 34% (N=114) of participants believed that the 'current government regulation adequately controlled the risk from an Australian based terrorist act' as compared to 38% (N=129) who thought the Australian federal government could do more.

One out of eight Australians believed terrorism was the main problem that faces Australia today (Australian Institute of Criminology, 2007). The divided opinions on this issue relate back to public opinion with Australia's role in the war on terror and Australia's increased profile on the world's stage. Many Australians believe that due to our efforts in regional and international anti-terrorism initiatives, Australia is now at greater risk from a terrorist attack. Concern was also shown about the threat to civil liberties from anti terrorism legislation, however Australia's chief secretary for the Attorney-General's Department thought that the terrorism legislation was necessary and appropriate at this time to meet Australia's anti-terrorism needs (Cornall, 2007).

7.5 Research Question 2

How does the public's psychometric risk perception of terrorism contrast with other known risks?

Spatial analysis demonstrated that the public's perception of terrorism was the second highest risk in terms of dread and ranked midrange in terms of familiarity. The study also revealed that the dread level of coal burning was more of a concern to the general public than was terrorism. The next most concerning dread respect to the public was appliance fires, commercial aviation and lastly microwave ovens. In terms of familiarity the study showed that appliance fires were the least familiar risk followed by terrorism, coal burning, commercial aviation and lastly microwave ovens. In addition each activity and or technology was also evaluated against the risk of terrorism using real world comparisons.

The study illustrated that although the public perceived that coal burning was a bigger risk than terrorism, historically it was terrorism that is the bigger risk. Australian terrorism related attacks consistently caused more fatalities, injuries or damage to infrastructure than any of the other risks surveyed. According to the study's results the expressed risks to Australians in order of rank were; coal burning (pollution), terrorism, commercial aviation, appliance fires and microwave ovens. Whereas the study's surveyed public's perceptions of risk ranked in order were coal burning (pollution), terrorism, appliance fires, commercial aviation and microwave ovens, these perceptions however do not match the real world data on these respective risks. Therefore in order to save lives and prevent injury or damage more broad based public education is needed to alert the community to these risk areas.

7.6 Study Assumption 1

Are Australian Government anti-terrorism campaigns effective in the view of the public?

A 2007 Lowy Institute poll of 1003 Australians asked *'How worried are you about potential threat of international terrorism from the outside world?'* 68% were either very worried or fairly worried. The study's factor characteristic profiling demonstrated that terrorism ranked highest of all the safety campaigns in the observability category (Mean=2.38, S.D=.954) with 62% of the public agreeing, that the ongoing anti-terrorism awareness campaigns had made them more aware of the risks. Conversely, 38% (N=129) of the public believe the Australian Government should be doing more to control the risks of a terrorist act, as compared to 34% (N=114) of participants who felt that the Australian federal government's current initiatives were adequate for the time being.

The Australian public also felt the need for these types of anti-terrorism campaigns, which is reflected in their response rate to the federal government's anti-terrorism hotline. Since its inception on 27th December 2002, the national security hotline has received over 93,000 calls, letters and emails from concerned members of the public (Attorney-General's Department, 2008). Therefore the study indicates that ongoing Australian government anti-terrorism campaigns are effective in the view of the general public, although the public also feel the federal government needs to do more to protect the country from the risks of terrorism.

7.7 The Study's Limitations

The project encountered a number of limitations that had to be considered to ensure the reliability and the validity of the study was accurate. The first problem the study found was in defining the nature of risk (Section 4.7.1) as not all respondents' perceived risk in same manner. This led to a number of data gathering and survey design issues which required a rethink on the study's methodology (Section 4.7.2). A particular concern of the project was to ensure the reliability and validity of the study, this aim was achieved by using probability sampling methodology. The technique was chosen, as this approach contained the least risk of bias to selection of cases from the researcher. However despite this a number of socio-economical factor based limitations were apparent, particularly in the choice of the location for the study. It was quickly realized that a number of participants could not be surveyed, due to a lack of access to the location caused by distance or transportation issues, old age, disability and or economic circumstance such as being homeless. It is due to these limitations that this study can only be viewed as a general representative sample not an accurate sampling representation.

The project's research design (Section 4.7.3) used the study's own 7-stage blueprint (see Figure 1.1). The blueprint was used in the collection, analysis and interpretation phases of study and was designed to ensure the integrity, quality and reliability in both the research and the data results. It is however acknowledged that there may be limitations in either the whole design or in any of its 7 stages. In addition limitations may also have resulted in the data derived from using this design or in the interpretation of the underlying methodology that underpins the study.

It is the nature of social research to investigate a known or unknown problem in an effort to find answers. One of the 'problems' that this study chose to investigate was 'how does the public's social risk perception of terrorism contrast with other known risks' The bulk of this study focused on the public's perception of terrorism and as such a research instrument was needed to measure this response. The tool of choice for this study was the Likert Survey (Section 4.7.4) although a time tested tool according to Gravetter & Forzano (2006, p. 335) "participants tend to avoid the two extreme categories at the opposite ends of the scale, especially if they are identified with labels that indicate extreme attitudes or opinions." It is therefore reasonable to assume that this study encountered similar limitations.

Another limitation with Likert based study's was that of *acquiescent responding* or answering in a positive or neutral response, regardless of the question being asked or the attitude felt toward the particular subject or issue. The study attempted to minimise this limitation in the survey design (Section 5.10.2) phase, by phrasing questions in both the positive and negative, however it is still possible that participants responded to the study through *acquiescent responding* due to haste, lack of interest in the study or misreading or not understanding the question being asked. A another limitation of Likert surveys is from their closed ended design as due to the nature of this structure, responses obtained may not reflect the true perception of the candidate being interviewed.

The study aimed to overcome this limitation by giving the participant scope to think of a number of risks instead of just focusing on one example used within the statement. It is however acknowledged that there may be limitations with using this approach as well. A final Likert survey limitation (Section 5.10.1) according to Kothari (1990, p.86) is that "Likert scales can only be used to determine whether a participant is more or less in favour of the topic and cannot measure the degree of their favourability or disagreement about a particular issue" Despite these limitations Likert scales have been used successfully in many social perception based studies around the world, including Slovic's (1987; 1992; 1997) risk perception studies.

Psychometric paradigm limitations (Section 5.10.3) of this study were many and varied, one of the themes addressed was whether using the psychometric paradigm for social research was justifiable in terms of obtaining accurate validity and reliability for the study. Sjöberg, (2006) believes that the psychometric paradigm was developed to address political attitudes and not public risk perception related to technological advancements and therefore not appropriate to use as a base for social risk perception research. Other psychometric paradigm limitations were also important as Renn & Rohrmann, (2000) state that public trust in new technology is often perceived to contain environment and or technology related hazards, this is especially true if there is a lack robust scientific assessment.

This perception according to Sjöberg, (1996b; 1997) undermines the dread and familiarity core measurements used in the psychometric paradigm. In addition, the study also investigated the psychometric paradigm limitations along the themes of the variance of the perceived risk relating to risk related consequences. Examination was also sought in the implications of

emotions, public attitudes and risk perceptions to resolve a perceived risk and finally the reliability and validity of Slovic's initial foundation study.

Another limitations that the study encountered, was a general lack of previous social risk research around the world but especially from an Australian context. This deficiency was especially true in regards to public perception terrorism based research. This in turn limited the study from gaining on previous insights or trends established by other researchers and thus the study lacked a historical research basis to build upon. It is only by knowing about this and other limitations that the project encountered, could the study address each of their respective shortcomings and thereby help to ensure both the reliability and validity of the total study.

7.8 Study Recommendations and Further Research

The study found that public's view of risk perception was critical when gauging risk. Aspects concerning the type, size and scale of the event, personal experience, media attention, expert understanding and the government's response all played a defining role into how a person perceives a risk and thus how they will respond to a particular risk (Sjöberg, 2000, 2000c). The issue was highlighted in the demographic phase of the study which encompassed gender / age distinctions.

The study found that gender based dread levels of risk were much higher in women then they were in men. Age also had a significant influence in determining dread levels, as the study found that younger people had lower dread ratings then older people. These findings were consistent with similar studies (Sjöberg, 2004; Howie, 2005; Whitten & Thompson, 2007; Philipps, 2007; Aly et al, 2007). However the issue needs further examination as to understand why women and older people are more risk averse then men and or younger people.

Overall however, the study found that there is a general increase in awareness, anguish and community concern amongst members of the general public, regarding a terrorist act occurring in Australia. The study results, indicate that anti-terrorism campaigns have been both far reaching and effective across both cultural and language barriers, throughout multicultural Australia. Australia's role in the region and the world in promoting democracy, racial as well as gender equality and finally religious tolerance, arguably place Australia, its politicians and its people as legitimate terrorist targets amongst the view of radical extremists (Department of Foreign Affairs and Trade, 2004, p.67). Due to this consideration in conjunction with Australia's limited capacity in its intelligence, police, military and other security resources, the study believes that there is an ongoing need for regular anti-terrorism campaigns and

advisories. These national and international services will help to inform, advise and protect Australians and Australian interests from potential harm.

Furthermore as a process of first response management and due to the ubiquitous nature of mobile telephones, the study recommends that in the event of a terrorist attack, that an area specific short message service (sms) should be transmitted to the wider public. This text based advisory could inform the public to go to a safe area, whereby loved ones, friends and associates could be accounted for. The advisory could also be used to inform the public of the nearest medical facility or to avoid a certain area in the case of a chemical, biological or radiological (CBR) based attack.

To encompass people who do not have mobile phones, are disabled or are sight or hearing impaired, the study further recommends that a city wide audio / visual emergency warning and public address system should be implemented. Once implemented the system could be used to protect the general public from harm in the event of a man-made, natural disaster or terrorist based attack. This type of system should also have publically accessible communication points that are strategically located around the city. These communication points will allow members of the general public to directly speak to an emergency services representative.

This type of communication will enable a rapid command, control and or medical response, as mobile phone services may be overwhelmed or indeed be the target of the attack. Additionally these communications systems could even be used to inform an emergency services representative in real time, the nature, scale and exact location of the event. The emergency warning / public address system and the text based sms service could have pre-recorded or a live voice message, to advise the public on what to do and where to go in times of emergency. Combined with city wide closed circuit camera systems, these facilities will provide emergency services with immediate access and control of affected area/s. This approach will reduce public confusion and panic by giving them relevant, accurate and timely information. This will increase the public's confidence in the authorities' instructions, whilst simultaneously enhancing citizen's safety and security.

The study also highlighted that there is a need for the investigation of the psychometric paradigm as a social research instrument. Disputes between Star and Slovic (1978; 1987; 1992) and Sjöberg (1996a; 2003) demonstrate that there may be problems with using this tool, as the basis of a social risk perception research instrument. One final research

recommendation is for the establishment of a nationwide study with a larger range of related activities and technologies, so perceived risks such as terrorism can be fully understood from a public based perspective. Increased understanding of how the public perceive risk/s will enable better risk based policy decisions on behalf of the general public and will also have benefits in other professional, government and industry based decision making bodies.

7.9 Conclusion

This study aimed to research the public's social risk perception of terrorism in an Australian context. By using psychometric related research concepts both risk professionals and the lay public gain a deeper understanding of how risk is perceived. This understanding will enable developments in risk related policy, analysis, communications and decision making that will be of overall benefit to both industry and the general community. This study has contributed to a growing knowledge database which security and risk professionals can use to not only assess the threat of terrorism, but also other comparable fire, health, safety and security risks. This knowledge will contribute towards an improved professionalism in security and other risk related industries.

REFERENCE LIST

- Aiken, R, L., Groth-Mamat, G. (2006). *Psychological testing and assessment*. (12th Ed). Boston: Allyn and Bacon, c.2006
- Aly, A., Balnaves, M., Chalon, C. (2007). Behavioural responses to the terrorism threat: Applications of the Metric of Fear. *Proceedings of the 2007 RNSA Security Technology Conference* (p.p. 248-255). Melbourne, 2007
- Anesi, C. (1997). *The United States strategic bombing survey*. Referenced examples for electronic sourced materials. Retrieved 24th Aug 2007 from <http://www.anesi.com/ussbs02.htm>
- Arkkelin, D. (n.d). *Using SPSS to Understand Research and Data Analysis*. Referenced examples for electronic sourced materials. Retrieved 12th Mar 2008. from wwwstage.valpo.edu/other/dabook/ch8/c8-3.htm
- Aspin, D.N. (1995). *Logical empiricism, post empiricism and education*. In P. Higgs (Ed). *Metatheories in Philosophy of Education*. Johannesburg: Heinemann. p.p. 21-49
- AS/NZS: 4360:1999. (1999). *Risk Management*. Strathfield, NSW: Standards Association of Australia, c1999.
- Attorney General's Department Annual Report. (2003-2004). *Outcome 2: Coordinated federal criminal justice, security and emergency management activity, for a safer Australia*. Referenced examples for electronic sourced materials. Retrieved 13 Aug 2007 from [http://www.ag.gov.au/www/agd/rwpattach.nsf/VAP/\(CFD7369FCAE9B8F32F341DBE097801FF\)~2003_ar_performance.pdf/\\$file/2003_ar_performance.pdf](http://www.ag.gov.au/www/agd/rwpattach.nsf/VAP/(CFD7369FCAE9B8F32F341DBE097801FF)~2003_ar_performance.pdf/$file/2003_ar_performance.pdf)
- Attorney Generals Department, (2005). *National Counter-Terrorism Plan*. Referenced examples for electronic sourced materials. Retrieved 26th May 2008 from [http://www.nationalsecurity.gov.au/agd/WWW/rwpattach.nsf/VAP/\(5738DF09EBC4B7EAE52BF217B46ED3DA\)~NCTP_Sept_2005.pdf/\\$file/NCTP_Sept_2005.pdf](http://www.nationalsecurity.gov.au/agd/WWW/rwpattach.nsf/VAP/(5738DF09EBC4B7EAE52BF217B46ED3DA)~NCTP_Sept_2005.pdf/$file/NCTP_Sept_2005.pdf)

Attorney Generals Department, (2006). *Australian laws to combat terrorism*. Referenced examples for electronic sourced materials. Retrieved 6th Feb 2008 from <http://www.ag.gov.au/agd/www/nationalsecurity.nsf/AllDocs/826190776D49EA90CA256FAB001BA5EA?OpenDocument>

Attorney-Generals Department, (2007). *What governments are doing?* Referenced examples for electronic sourced materials. Retrieved 6th Feb 2008 from <http://www.ag.gov.au/agd/www/nationalsecurity.nsf/AllDocs/9EDD156E9DA7C75FCA25716F000C9401?OpenDocument>

Attorney-General's Department. (2007.a). *National security public information campaign*. Referenced examples for electronic sourced materials. Retrieved 13th Aug 2007 from http://www.nationalsecurity.gov.au/agd/WWW/nationalsecurity.nsf/Page/National_Security_Public_Information_Campaign

Attorney-General's Department. (2007.b). *Australian laws to combat terrorism*. Referenced examples for electronic sourced materials. Retrieved 13th Aug 2007 from http://www.nationalsecurity.gov.au/agd/WWW/NationalSecurity.nsf/Page/What_Governments_are_doing

Attorney Generals Department. (2007.c). *Security Environment Update*. Referenced examples for electronic sourced materials. Retrieved 27th May 2008 from <http://www.nationalsecurity.gov.au/agd/www/nationalsecurity.nsf/AllDocs/9EDD156E9DA7C75FCA25716F000C9401?OpenDocument>

Attorney-Generals Department, (2008). *National security public information campaign*. Referenced examples for electronic sourced materials. Retrieved 6th Feb 2008 from http://www.ag.gov.au/agd/WWW/NationalSecurity.nsf/Page/National_Security_Public_Information_Campaign

Australian Bureau of Statistics, (2008). *2006 Census community profile series: Warwick* (State suburb). Referenced examples for electronic sourced materials. 26th Mar 2008 from <http://www.censusdata.abs.gov.au/ABSNavigation/prenav/ViewData?&action=404&documentproductno=SSC52466&documenttype=Details&tabname=Details&areacode=SS>

C52466&issue=2006&producttype=Community%20Profiles&&producttype=Community%20Profiles&javascript=false&textversion=false&navmapdisplayed=true&breadcrumb=LPD&&collection=census&period=2006&producttype=Community%20Profiles&#Basic%20Community%20Profile

Australian Federal Police. (2007a). *Australian Bomb Data Centre (ABDC)*. Referenced examples for electronic sourced materials. Retrieved 22nd May 2007 from <http://www.afp.gov.au/services/operational/abdc.html>

Australian Federal Police. (2007b). *Australian Bomb Data Centre Annual Report 2007*. Referenced examples for electronic sourced materials. Retrieved 20th May 2007 from http://afp.gov.au/__data/assets/pdf_file/80673/ABDC_Annual_Report_2007.pdf

Australian Fire and Emergency Service Authorities Council. (2006). *Total Fires by Fire Type and Equipment Involved in Ignition 2005/2006*. Referenced examples for electronic sourced materials. Retrieved 5th Sep 2008 from http://dev.afac.com.au/__data/assets/pdf_file/0020/7238/Total_fires_by_Type_of_Fire_and_Equipment_involved_in_ignition.pdf

Australian Government. (2007). *National health and medical research councils: Review of the Joint NHMRC / AVCC statement and guidelines on research practice (1997)*. Referenced examples from electronic sourced materials. Retrieved 25th Mar 2007 from <http://www.nhmrc.gov.au/funding/policy/code.htm>

Australian Institute of Criminology. (2007). *What Australians think about Crime and Justice: Results from the 2007 Survey of Social Attitudes*. Referenced examples from electronic sourced materials. Retrieved 6th June 2009 from <http://www.aic.gov.au/documents/4/8/A/%7B48A3B38B-376E-4A7A-A457-AA5CC37AE090%7Drpp101.pdf>

Australian Parliamentary Library, (2008). *Terrorism law*. Referenced examples for electronic sourced materials. Referenced examples from electronic sourced materials Retrieved 6th Feb 2008 from <http://www.aph.gov.au/library/intguide/law/terrorism.htm#2005>

- Australian Parliamentary Library. (2008a). *Terrorism law*. Referenced examples for electronic sourced materials. Retrieved 17th June 2008 from <http://www.aph.gov.au/library/intguide/law/terrorism.htm>
- Australian Politics. (2001). *Government invokes ANZUS treaty - Prime minister's press conference*. Referenced examples for electronic sourced materials. Retrieved 1st Apr 2008 from <http://www.australianpolitics.com/foreign/anzus/01-09-14anzus-invoked.shtml>
- Australian Radiation Protection and Nuclear Safety Agency, (2006). Radiation emissions from microwave ovens. Referenced examples for electronic sourced materials. Retrieved 5th Sep 2008 from http://www.arpansa.gov.au/radiationprotection/factsheets/is_Microwave.cfm
- Australian Therapeutic Goods Administration, (1998). The year 2000 and medical devices. *Australian Therapeutic Devices Bulletin*, 35, 1-12
- Australian Transport Safety Bureau. (2007). *Accidents, Fatal Accidents and Fatalities to All Australian Registered (VH-) Civil Aircraft by years for 1998-2007*. Referenced examples for electronic sourced materials. Retrieved 5th Sep 2008 from http://www.atsb.gov.au/pdfs/statistics/1998_2007_all.pdf
- Australian Research Council, (2007). *The national statement on ethical research involving humans*. Referenced examples for electronic sourced materials. Retrieved 20th May 2007 from http://www.nhmrc.gov.au/publications/synopses/_files/e72.pdf
- Babbie, R, E. (2001). *The practice of social research*. (9th Ed). Australia; London: Wadsworth/Thomson Learning, c2001.
- Babbie, R, E. (2005). *The basics of social research*. Australia; London: Wadsworth/Thomson Learning, c2005.
- Banks, L.M. (1995). *The office of strategic services psychological selection program*. Unpublished masters' thesis, U.S. Army Command and General Staff College.

- Bartholomew, J., D. (2004). *Measuring intelligence: Facts and fallacies*. Cambridge University Press, c.2004
- Bauer, R., A. (1960). Consumer behaviour as risk taking. In R.S Hancock (ed). *Dynamic marketing for a changing world*. Pro 43rd Conference, Chicago, IL: American Marketing Association, 389-400
- Becker, K. A. (2003). *History of the Stanford-Binet intelligence scales: Content and psychometrics*. Stanford-Binet Intelligence Scales, Fifth Edition Assessment Service Bulletin No. 1. Itasca, IL: Riverside Publishing
- Bureau of Transport and Regional Economics. (2007). *Australian transport statistics*. Referenced examples for electronic sourced materials. Retrieved 6th Sep 2008 from <http://www.btre.gov.au/publications/46/Files/ATS2007.pdf>
- Beyerer, J. (2007). Future Security. 2nd Security Research Conference, Karlsruhe, 12th -14th September. Universitaetsverlag, Karlsruhe
- Biemer, P, P. (2003). *Introduction to survey quality*. Hoboken, NJ: John Wiley & Sons, Inc., 2003.
- Bongar, M, B., Bongar, B., Brown, M, L., Beutler, E, L, Zimbardo, G, P. (2007). *Psychology of Terrorism*. Oxford University Press, c.2007
- Brew, N. (2003). Parliamentary library research note no. 23 2003-04; *The new national threat assessment centre*. Referenced examples for electronic sourced materials. Retrieved 17th June 2008 from <http://www.aph.gov.au/library/pubs/rn/2003-04/04rn23.htm>
- Brozek, J. (1984). *Explorations in the History of Psychology in the United States*. Bucknell University Press, c.1984
- Burns, W, J., Slovic, P., Kasperson, R.E., Kasperson, J, X., Renn, O and Emani, S. (1993). Incorporating structural models into research on the social amplification of risk: Implications for theory construction and decision making. *Risk Analysis*, 13(6), 611-624

- Cambridge English Dictionary, (2007) *Definition: Validity*. Referenced examples for electronic sourced materials. Retrieved 22nd Mar 2007 from <http://dictionary.cambridge.org/define.asp?key=87683&dict=CALD>
- Capshew, H., J. (1999). Psychologists on the March: Science, practice, and professional identity in America, 1929-1969. *Cambridge University Press*, c.1999
- Carmines, G, E., Zeller, A, R. (1979). *Reliability and validity assessment: Quantative applications in social science*. Sage Publications. c.1979
- Carver, P, R., DuBois, H, P. (1967). *The Relationship between Learning and Intelligence. Journal of Educational Measurement*, 4, (3), 133-136
- Cattell, J, M. (1890). *Mental tests and measurements*. *Mind*, 15, (59) 373-381
- Chilton, S., Covey, J., Hopkins, L., Jones-Lee, M. Loomes, G., Pidgeon, N., Spencer, A. (2002). Public perceptions of risk and preference - based values of safety. *The Journal of Risk and Uncertainty*, 25:3, 211-323
- City of Joondalup. (2006). *My suburb: Warwick*. Referenced examples for electronic sourced materials. Retrieved 26th Mar 2008 from http://www.joondalup.wa.gov.au/cms/templates/coj2_council_pg.asp?id=256&pr=list&suburb=Warwick
- Cohen, L., Manion, L., Morrison, K. (2000). *Research methods in education*. (5th Ed). New York: Routledge, c2000.
- Colman, M, A. (1999). *What is psychology?* (3rd Ed). Routledge. c1999.
- Colosi, A, L. (1997). *Social Research Methods Glossary of Terms*. Referenced examples for electronic sourced materials. Retrieved 13th May 2007 from <http://www.socialresearchmethods.net/tutorial/Colosi/lcolosi4.htm>
- Collins English Dictionary. (2002). Harper Collins Publishers Limited. c.2002.

- Conduct of ethical research involving human subjects. (n.d). *Policy and procedures: Academic affairs*. Referenced examples for electronic sourced materials. Retrieved 13th May 2007 from http://www.ecu.edu.au/GPPS/policies_db/tmp/ac023.pdf
- Commonwealth Criminal Code Act (1995). *The Criminal Code: The security of the Commonwealth, Chapter 5: Terrorism. Part 5.3. Preliminary: Division 100*. Referenced examples for electronic sourced materials. Retrieved 12th Sep 2007 from [http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/9A0B7C98033F8042CA25734100009F94/\\$file/CriminalCode1995_WD02.pdf](http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/9A0B7C98033F8042CA25734100009F94/$file/CriminalCode1995_WD02.pdf)
- Cornall, R. (2007). Making it happen: National security policy- Keeping Australia safe. Speech delivered to the Queensland Regional Heads Forum 18 May 2007
- Cox, D., F. (1967). Synthesis-perceived risk and information handling. In D, F Cox (ed). *Risk taking and information handling in consumer behaviour*. Boston, MA: Harvard University Press, 370-392
- Cousins, K., Brunt, P. (2002). *Terrorism, Tourism and the Media*. Security Journal 15, 19–32
- Croddy, E., Wirtz, J, J. (2004). *Weapons of mass destruction; An encyclopaedia of worldwide policy, technology, and history*. ABC-CLIO, c.2004
- Davidson, E, J., Sternberg, J, R. (2003). *The Psychology of Problem Solving*. Cambridge University Press, c.2003
- Dawkins, R. (2006). *The God Delusion*. Houghton Mifflin Books, c.2006.
- Daymon, C., Holloway, I. (2002). *Qualitative research methods in public relations and marketing communications*. London; New York: Routledge, c.2002.
- Department of Defence. (2007). *Defence response to a terrorist incident within Australia*. Referenced examples for electronic sourced materials. Retrieved 7th July 2008 from <http://www.defence.gov.au/terrorism/>

- Department of Foreign Affairs and Trade. (2004). *Transnational Terrorism: The Threat to Australia*. Referenced examples for electronic sourced materials. Retrieved 12th Sep 2007 from http://www.dfat.gov.au/publications/terrorism/transnational_terrorism.pdf
- Department of Foreign Affairs and Trade. (2004a). *Transnational Terrorism: The Threat to Australia*. Referenced examples for electronic sourced materials. Retrieved 6th Feb 2008 from <http://www.dfat.gov.au/publications/terrorism/chapter6.html>
- Department of Foreign Affairs and Trade. (2004b). *Transnational Terrorism: The Threat to Australia*. Referenced examples for electronic sourced materials. Retrieved 17th June 2008 from <http://www.dfat.gov.au/publications/terrorism/chapter7.html>
- Dictionary.Com. (2006). *Psychometrics*. Referenced examples for electronic sourced materials. Retrieved 28th May 2007 from <http://dictionary.reference.com/browse/psychometrics>
- Dixon, B. R. (1987). *A handbook for social science research*. New York: Oxford University Press
- Dooley, D. (2001) *Social research methods*. (4th Ed). Upper Saddle River, N.J.: Prentice Hall, c.2001
- Drenth, D., J., P., Wolf, J., C., Thierry, H. (1999). Handbook of work and organizational psychology. (2nd ed). Psychology Press, c.1998
- Drottz-Sjöberg, B.-M., & Sjöberg, L. (1990). Risk perception and worries after the Chernobyl accident. *Journal of Environmental Psychology*, 10, 135-149
- Dyer, C. (2006). *Research in psychology: a practical guide to methods and statistics*. Malden, MA: Blackwell Pub., c.2006

- Edith Cowan University (2003). Guidelines on the responsible conduct of research and scholarship. Referenced examples for electronic sourced materials. Retrieved 28th May 2007 from http://www.research.ecu.edu.au/ori/data/tmp/research_code_of_conduct.pdf
- Edmonds, M. & Cerny, O. (2003). Proceedings of the NATO Advanced Research Workshop on Future NATO Security, 8-10 March 2003, Prague, Czech Republic
- Encyclopaedia Britannica Online. (2007). *Psychometrics*. Referenced examples for electronic sourced materials. Retrieved 28th May 2007 from <http://www.britannica.com/dictionary?va=psychometrics>
- Federal Bureau of Investigation, (2003). *Counterterrorism facts and figures*. Referenced examples for electronic sourced materials. Retrieved 2nd Apr 2008 from <http://www.fbi.gov/libref/factsfigure/counterterrorism.htm>
- Federal Bureau of Investigations, (2005). *FBI Laboratory 2005 Report: FBI Publication #0357*. Federal Bureau of Investigation, Quantico, Virginia, c.2005.
- Federal Bureau of Investigations, (2006). *Domestic terrorism tip leads to sting, prison for plotter*. Referenced examples for electronic sourced materials. Retrieved 10th July 2008 from <http://www.fbi.gov/page2/nov06/terror112906.htm>
- Fischhoff, B., Slovic, P., Lichtenstein, S. (1977). Behavioral aspects of cost-benefit analysis. *Proceedings of a workshop on the measurement of intangible environmental impacts* (pp. 3-21 to 3-33). Richland, WA: Sigma Research, Inc.
- Fischhoff, B., Slovic, P., Lichtenstein, S. & Read, S. & Combs, B. (1978). How safe is safe enough? A psychometric study of attitudes towards technological risks and benefits, *Policy Sciences* 8: 127-152.
- Fischhoff, B., Slovic, P., Lichtenstein, S. (1979). Weighing the risks. *Environment*, 21(4), 17-20, 32-38. In R. W. Kates, C. Hohenemser, & J. X. Kasperson (Eds.), *Perilous progress: Technology as hazard*. Boulder, CO: Westview, 1985.

- Fischhoff, B., Lerner, S. J., Gonzalez, M. R., Small, A. D. (2003). *Effects of fear and anger on perceived risks of terrorism: A national field experiment*. *Psychological Science*, 14 (2), 144-150.
- Food and Drug Administration, (2005). 2005 Budget in brief: Promoting and protecting public health. Referenced examples for electronic sourced materials. Retrieved 26th June 2008 from <http://www.fda.gov/oc/oms/ofm/budget/2005/BIB/BIB2005.htm>
- Food Science Australia. (2005). *The safety of microwave ovens*. Referenced examples for electronic sourced materials. Retrieved 5h Sep 2008 from <http://www.foodscience.csiro.au/microwave1.htm>
- Galton, F. (1892). *Hereditary genius: An inquiry into its laws and consequences*. McMillian Press. London, c.1892.
- Griset, L. P., Mahan, S. (2002). *Terrorism in perspective*. SAGE Publishing, c.2002.
- Glover, A. J., Ronning, R. R. (1987). *Historical foundations of educational psychology: Perspectives on individual differences*. Springer Publishing, c.1987.
- Gordon, M. T., & Riger, S. (1979). Fear and avoidance: A link between attitudes and behaviour. *Victimology* 4: 395- 402.
- Goodwin, R., Willison, M., Stanley, G. (2005). *Terror threat perception and its consequences in contemporary Britain*. *British Journal of Psychology*. 96, (4). 389-406.
- Gravetter, J. F., Forzano, B. L. (2006). *Research methods for the behavioural sciences*. (2nd Ed) Australia: Thomson/Wadsworth, c.2006.
- Gregory, I. (2003). *Ethics in research*. London; Continuum, c2003.
- Gyngell, A. (2007). *Australia and the world: Public opinion and foreign policy*. Referenced examples for electronic sourced materials. Retrieved 19th June 2007 from www.lowyinstitute.org/PublicationGet.asp?i=660

- Hair, J.F. et al. (1992) *Multivariate data analysis* (3rd ed.). New York: Macmillan.
- Hakel, D, M. (1998). *Beyond Multiple Choice: Evaluating Alternatives to Traditional Testing for Selection*. Lawrence Erlbaum Associates. c.1988
- Hamm, S, M. (2007). Terrorism as crime: from Oklahoma City to Al-Qaeda and beyond. *NYU Press, c.2007*
- Howard, D, R., Forest, F, J, J., Moore, C, J. (2005). *Homeland security and terrorism: Readings and interpretations*. McGraw-Hill Professional. c.2005
- Howie, L. (2005). There is nothing to fear but fear itself (and terrorists): Public perception, terrorism and the workplace. *Social Change in the 21st Century Conference*, (1-11). Queensland: QUT.
- Huddy, L. , Feldman, S. and Cassese, E. C. (2008) *Gender Differences in Response to Terrorism and War* Proceedings of the Southern Political Science Association Conference, Hotel Intercontinental, New Orleans, LA.
- Human Research Ethics Committee, (2004). *Role of the HREC* Referenced examples for electronic sourced materials. Retrieved 20th May 2007 from http://www.ecu.edu.au/GPPS/ethics/human_ethics_committee.html
- Human Rights and Equal Opportunity Commission (2007). *National consultations on eliminating prejudice against Arab and Muslim Australians*. Referenced examples for electronic sourced materials. Retrieved 23rd May 2008 from http://www.hreoc.gov.au/racial_discrimination/isma/index.html
- Jansz, J., Van Drunen, P. (2003). *A social history of psychology*. Blackwell Publishing, c.2003
- Jenkin, M., C. (2006). Risk perception and terrorism: Applying the psychometric paradigm. *Journal of the Naval Postgraduate School Centre for Homeland Defense and Security*. 2 (2) 1-14
- Jongeling, S. B., Reid, C. (2007). *Referencing guide* (9th rev. Ed.). Perth: Edith Cowan University. c.2007

- Jupp, V. (2006). *The SAGE dictionary of social research methods*. London; Thousand Oaks, Calif: SAGE Publications, c2006
- Kahneman, D., Amos Nathan Tversky, N., A., Slovic, P. (1982). *Judgement of and by representativeness*. In *Judgment Under Uncertainty: Heuristics and Biases*. Cambridge University Press, p.p. 84-100
- Kasperson, J. (2003) The social amplification of risk: Assessing fifteen years of research and theory. In *The social amplification of risk*. Cambridge: Cambridge University Press.
- Kasperson, R, E. (1992). The social amplification of risk: progress in developing an integrative framework of risk. In Krimsky, S and Golding, D. (Ed). *Social theories of risk*. Westport, CT: Praeger, p.p. 153-178.
- Kasperson, R, E., Kasperson, J, X. (1996). The social amplification and attenuation of risk. *The Annals of the American Academy of political and Social Sciences*, 545: 95-105.
- Kasperson, R, E., Renn, O., Slovic, P., Brown, H, S., Emel, J., Goble, R., Kasperson, J, X., and Ratick, S, J. (1998). The social amplification of risk: A conceptual framework. *Risk Analysis*, 8 (2), 178-187.
- Kates, R. (1977). Experiencing the environment as a hazard. In S, Wapner, S, Cohen, B, Kaplan (Eds). *Experiencing the environment*. New York, Plenum, 1977, 133-156.
- Keith F. Punch, F, K. (2000). *Developing effective research proposals*. London: Sage, c.2000.
- Kimble, A., G., Wertheimer, M. (2003). *Portraits of Pioneers in Psychology: Volume V*. Lawrence Erlbaum Associates, c.2003.
- Kinnear, C, T., Taylor, R, J. (1996). *Marketing research: An applied approach*. (5th Ed). New York: McGraw-Hill, 1996.
- Kopala, M., Suzuki, A, L. (1999). *Using qualitative methods in psychology*. Thousand Oaks: Sage, c.1999

- Koppes, L., L. (2006). *Historical perspectives in industrial and organizational psychology*. Routledge, c.2006.
- Kothari, R, C. (1990). *Research methodology: Methods & techniques. (2nd ed)*. New Delhi : Wishwa Prakashan, New Age Publishers, c.1990.
- Koulikov, M. (2003). Assessing measurement equivalence of English and Spanish Versions of an employee attitude survey using multigroup analysis in structural equation modelling. Digital Library Unt, meta-dc-4315:1. Unpublished masters' dissertation, University of North Texas, Texas.
- Kumar, R. (1996). *Research methodology: a step-by step guide for beginners*. Melbourne: Longman Australia, c.1996
- Kumar, R. (2005). *Research methodology: a step-by-step guide for beginners*. (2nd Ed). Frenchs Forest, N.S.W: Pearson Longman, c.2005.
- Likert, R. (1932), "A technique for the measurement of attitudes", *Archives of Psychology* 14, 1-55.
- Litwin, S, M. (1995). *How to measure survey reliability and validity*. (V.7). Sage Publications.
- Lowly Institute for International Policy. (2007). *Australians speak on foreign policy*. Referenced examples for electronic sourced materials. Retrieved 5th Sep 2008 from http://lowyinstitute.richmedia-server.com/sound/2007_Poll_Media_Release.pdf
- Maxim, S, P. (1999). *Quantitative research methods in the social sciences*. New York: Oxford University Press, c.1999.
- McClure, A, S. (1997). *Security decay*. [microform]: The erosion of effective security. Edith Cowan University. Faculty of Science, Technology and Engineering. c.1997.
- McCoy, R. G. (1995). Qualitative research. In R.L. Edwards (Ed), *Encyclopaedia of social work*. (19th Ed), pp. 2009-2015. Washington, DC: NASW Press.

- McDougall, D. (2006). Australia and the "War on Terrorism": A preliminary assessment, In Shearman, P & McDougall, D. (Eds.), *Australian security after 9/11: New and old agenda* Ashgate Publishing, c.2006.
- McLennan, W. (1999). *An introduction to sample surveys: A users guide*. Australian Bureau of Statistics, Canberra, c.1999.
- McNeill, P., Chapman, S. (2005). *Research methods*. Abingdon, Ox. ; New York, NY: Routledge, c2005.
- Megalogenis, G. (2008 August 19). Voters cool on war but fear terrorism. *The Australian* Referenced examples for electronic sourced materials. Retrieved 30th Aug 2008 from <http://www.theaustralian.news.com.au/story/0,25197,24203877-5001561,00.html>
- Merriam-Webster Online Dictionary (2007). *Validity*. Referenced examples for electronic sourced materials. Retrieved 22nd Mar 2007 from <http://www.m-w.com/dictionary/validity>
- Michell, J. (1999). *Measurement in Psychology: A critical history of a methodological concept*. Cambridge University Press, c.1999.
- Morgan, G., Levine, M. (2005). World Issues, Australian Issues and Australian Infrastructure Challenges. Proceedings from the National Infrastructure Investment Leaders' Summit (pp 1-6) Melbourne, Australia.
- Mullen, M.R. (1995). *Diagnosing measurement equivalence in cross-national research*. Journal of International Business Studies, 26 (3), 573-596.
- Murphy, R., K., Davidshofer, O., C (2001). *Psychological testing: Principles and applications*. (5th ed). Upper Saddle River, N.J.: Prentice Hall, c.2001.
- Nachmias, C., Nachmias, D. *Research methods in the social sciences*. (6th Ed). New York: Worth Publishers, c2000.

- Nardi, M.,P. (2006). *Doing survey research: A guide to quantitative methods*. (2nd Ed). Boston, Mass.: Pearson/Allyn & Bacon, c2006.
- National Counter Terrorism Centre. (2007). *World wide incident tracking system*. Referenced examples for electronic sourced materials. Retrieved 26th 1st Oct 2008 from <http://wits.nctc.gov/RunSearchQuick.do>
- National Health and Medical Research Council. (2006). *The Australian code for the responsible conduct of research*. Referenced examples for electronic sourced materials. Retrieved 19th June 2007 from http://www.nhmrc.gov.au/publications/synopses/_files/r39.pdf
- National Statistical Service, (n.d) *Sample size calculator*. Referenced examples for electronic sourced materials. Retrieved 26th Mar 2008 from <http://www.nss.gov.au/nss/home.NSF/pages/Sample+size+calculator>
- Nelson, B. (2006). Address to the Bradfields Forum. "*The ANZUS Alliance*". *Check against delivery*. Referenced examples for electronic sourced materials. Retrieved 1st Apr 2008 from <http://www.minister.defence.gov.au/NelsonMinSpeechtpl.cfm?CurrentId=5986>
- Newman, G, D. (2006). *An Analysis of In-flight Passenger Injuries and Medical Conditions 1 January 1975 to 31 March 2006*. Referenced examples for electronic sourced materials. Retrieved 5th Sep 2008 from <http://www.atsb.gov.au/publications/2006/pdf/B20060171.pdf>
- Newman, M, D.,O'Brien, J. (2006). *Sociology: Exploring the Architecture of Everyday Life*. (6th Ed). Pine Forge Press, c2006.
- Nunnally, J,C. & Bernstein, I, H. (1994). *Psychometric Theory* (3rd Edition). McGraw-Hill Series in Psychology, McGraw-Hill, Inc., New York: NY, 264-265.
- O'Sullivan,P. (2006, March). Address to Canberra-based EU Ambassadors. Terrorism and Security - the Australian and European experiences. National Press Club, Canberra.
- Outreville, F, J. (1998). *Theory and practice of insurance*. Springer Publishing, c.1998.

- Oxford English Dictionary (1989). *Validity*. Referenced examples for electronic sourced materials. Retrieved 22nd Mar 2007 from <http://0dictionary.oed.com.library.ecu.edu.au/cgi/entry/50274591>
- Oxford English Dictionary (1989). *Ethics*. Referenced examples for electronic sourced materials. Retrieved 25th Mar 2007 from <http://dictionary.oed.com/cgi/entry/50078466/50078466se2>
- Phillips, J. (2007). *Muslim Australians*. Referenced examples for electronic sourced materials. Retrieved 23rd June 2008 from http://www.aph.gov.au/library/INTGUIDE/SP/Muslim_Australians.htm#discrimination
- Plapp, T., Werner, U. (2006). *Understanding risk perception from natural hazards: examples from Germany*. Referenced examples for electronic sourced materials. Retrieved 22nd Dec 2007 from www.gknk.uni-karlsruhe.de/tina/nhess-6-471%20Plattner%20Plapp%20Hebel%202006.pdf
- Ployhart, E., R., Schneider, B., Schmitt, N. (2006). *Staffing organizations: Contemporary practice and theory*. Routledge, c.2006.
- Plucker, J. A. (Ed.). (2003). Human intelligence: Historical influences, current controversies, teaching resources. Retrieved 29th Nov 2007 from <http://www.indiana.edu/~intell>
- Queensland Environmental Protection Agency. (2002, August). Environmental protection agency: Queensland parks and wildlife service [Newsletter, 15], 1-16.
- Ramsay, J. (2001). *Psychometrics*. In Smelser, J, N., Baltes, B, P (ED). *International encyclopaedia of the social and behavioural sciences*. 12416 – 14422. Amsterdam; New York: Elsevier, 2001.
- Reith, P. (2001). [Transcript] of a radio interview of the Hon Peter Reith MP and Derryn Hinch – 3 AK Referenced examples for electronic sourced materials. Retrieved 11th June 2008 from <http://www.minister.defence.gov.au/ReithSpeechTpl.cfm?CurrentId=999>

- Renn, O., (1991). Risk communication and the social amplification of risk. In R. E. Kasperson and Stallen, M, P, J. (Ed). *Communicating risks to the public: International perspectives*. Dordrecht: Kluwer Academic Press, p.p. 287-234.
- Renn, O., Burns, W., Kasperson, R.E., Kasperson, J.X., Slovic, P. (1992). *The social amplification of risk: Theoretical foundations and empirical application*. Social Issues, Vol. 48, No. 4, Special Issue: Public Responses to Environmental Hazards, 137-160.
- Renn, O., Rohrman, B. (2000). *Cross-cultural risk perception: A survey of empirical studies*. Springer, c.2000
- Rieber, W, R., Robinson, K, D. (2001). *Wilhelm Wundt in history: The making of a scientific psychology*. Springer Publishing, c.2001.
- Rowland, F. (n.d). *The peer review process*. Referenced examples for electronic sourced materials. Retrieved 22nd May 2007 from http://www.jisc.ac.uk/uploaded_documents/rowland.pdf
- Rosnow, L, R., Rosenthal, R, (1997). *People studying people: Atifacts and ethics in behavioural research*. New York: W.H. Freeman, c1997.
- Rosnow, L, R., Rosenthal, R, (2005). *Beginning behavioral research : a conceptual primer*. Upper Saddle River, N.J. : Pearson/Prentice Hall, c2005.
- Rowe, G., & Wright, G. (2001). Differences in expert and lay judgments of risk: myth or reality? *Risk Analysis*, 21, 341-356.
- Ruane, M, J. (2005). *Essentials of research methods: A guide to social science research*. Malden, MA: Blackwell Publishing, c.2005.
- Russo, R. (2003). *Statistics for the Behavioural Sciences: An Introduction*. Psychology Press, c.2003

- Rust, J, Golombok, S. (1999). *Modern Psychometrics: The Science of Psychological Assessment*. (2nd Ed). Routledge, c.1999.
- Sargent, R, A., & Brooks, D, J. (2007). *An analysis of how the perception of risk influences decision making*. Paper presented at the 7th Australasian Security Research Symposium, Edith Cowan University, Perth, WA.
- Schwab, P, D. (2005). *Research methods for organizational studies*. Mahwah, N.J.: L. Erlbaum Associates, c.2005.
- Sharp, S. E. (1899). *Individual psychology: A study in psychological method*. American Journal of Psychology, 10, 329-391.
- Shye, S. (n.d). *Louis (Eliyahu) Guttman*. Unpublished paper. The Hebrew University of Jerusalem.
- Singleton, A, R., Straits, C, B. (1996). *Approaches to social research*. (3rd Ed). New York; Oxford: Oxford University Press, c.1999
- Sinharay, S., R., Radhakrishna, C. (2006). *Psychometrics*. Elsevier. c.2006.
- Sjöberg, L. (1996a). A discussion of the limitations of the psychometric and Cultural Theory approaches to risk perception. *Radiation Protection Dosimetry*, 68, 219-225.
- Sjöberg, L. (1996b). Risk perception and attitude to Swedish membership in the EU). Stockholm: Styrelsen för Psykologiskt Försvar.
- Sjöberg, L. (1997). The election to the EU Parliament in 1995. A social psychological study. Stockholm: Styrelsen för psykologiskt försvar.
- Sjöberg, L. (1998). Worry and risk perception. *Risk Analysis*, 18(1), 85-93.
- Sjöberg, L. (1999a). Consequences of perceived risk: Demand for mitigation. *Journal of Risk Research*, 2 (2), 129-149.

- Sjöberg, L. (2000). Factors in risk perception. *Risk Analysis* 20: 1-11.
- Sjöberg, L. (2000a). The different dynamics of personal and general risk. In M. P. Cottam, D. W. Harvey, R. P. Pape & J. Tait (Eds.), *Foresight and precaution. Volume 1* (pp. 1149-1155). Rotterdam: A. A. Balkema.
- Sjöberg, L. (2000b). The methodology of risk perception research. *Quality and Quantity* 34: 407-418.
- Sjöberg, L. (2000c). Specifying factors in radiation risk perception. *Scandinavian Journal of Psychology*, 41, 169-174.
- Sjöberg, L. (2001). Limits of knowledge and the limited importance of trust. *Risk Analysis*, 21(1), 189-198.
- Sjöberg, L. (2002a). The allegedly simple structure of experts' risk perception: An urban legend in risk research. *Science Technology & Human Values*, 27 (4), 443-459.
- Sjöberg, L. (2003). Risk perception is not what it seems: The psychometric paradigm revisited. In K. Andersson (Ed.), *VALDOR Conference 2003* (pp. 14-29). Stockholm: VALDOR.
- Sjöberg, L. (2003a). The different dynamics of personal and general risk. *Risk Management: An International Journal*, 5(3), 19-34.
- Sjöberg, L. (2003b). Risk perception, emotion, and policy: The case of nuclear technology. *European Review*, 11(1), 109-128.
- Sjöberg, L, Moen, Bjorg-Elin, Rundmo, Torbjorn. (2004). *Explaining risk perception: An evaluation of the psychometric paradigm in risk perception research*. Rotunde Publishing 84, 1-33
- Sjöberg, L. (2004a). Antagonism, trust and risk perception, Paper invited by Lawrence Livermore National Laboratory to a meeting on "Living with Risk" Project. Boston: Center for Global Security Research/ International Institute for Strategic Studies.

- Sjöberg, L. (2004b). *Gene technology in the eyes of the public and experts. Moral opinions, attitudes and risk perceptions*, SSE/EFI Working Paper Series in Business.
- Sjöberg, L. (2004c). The perceived risk of terrorism. Available from the Center for Risk Research, Stockholm, School of Economics, Stockholm, Sweden.
- Sjöberg, L. (2006). *Myths of the psychometric paradigm and how they can misinform risk communication*. Referenced examples for electronic sourced materials. Retrieved 5th June 200 from http://swoba.hhs.se/hastba/papers/hastba2006_010.pdf
- Sjöberg, L., & Drottz, B.-M. (1987). Psychological reactions to cancer risks after the Chernobyl accident. *Medical Oncology and Tumor Pharmacotherapy*, 4(3-4), 259-271.
- Sjöberg, L., & Drottz-Sjöberg, B.-M. (1994). *Risk perception of nuclear waste: experts and the public* (Rhizikon: Risk Research Report No. 16): Center for Risk Research, Stockholm School of Economics.
- Slovic, P. (1962). Convergent validation of risk-taking measures. *Journal of Abnormal and Social Psychology*, 65, 68-71.
- Slovic, P. (1986). *Informing and educating the public about risk*. *Risk Analysis*, 4, 403-415.
- Slovic, P. (1987). *Perception of Risks*. *Science*, 236, 280-285.
- Slovic, P. (1992). *Perception of risk: Reflections on the psychometric paradigm*. In Krimsky, S. & Golding, D. *Social theories of risk*. Westport, Conn: Praeger, 1992.
- Slovic, P. (1997a). *Risk perception and trust*. In V.Molack (ED). *Fundamentals of risk analysis and risk management*. , (p.p. 233-245). CRC. Press.
- Slovic, P. (1997b). Public perception of risk. *Journal of Environmental Health*, 59 (9), 22-23, 54.

- Slovic, P. (2002). Terrorism as hazard: A new species of trouble. *Risk Analysis*, 22 (3), 425-426.
- Slovic, P. (2007). Perception of risk from asteroid impact. In P. Bobrowsky & H. Rickman (Eds.), *Comet/Asteroid Impacts and Human Society*. Springer-Verlag Berlin Heidelberg, (369-382).
- Slovic, P., Kunreuther, H., & White, G.F. (1974). Decision processes, rationality and adjustment to natural hazards. In G. F. White (Ed.), *Natural hazards, local, national and global*. New York: Oxford University, 187-205.
- Slovic, P., Fischhoff, B., & Lichtenstein, S. (1976). Cognitive processes and societal risk taking. In H. Jungermann & G. De Zeeuw (Eds.) *Decision making and change in human affairs*. The Netherlands: Dordrecht, 7-36.
- Slovic, P., Fischhoff, B., & Lichtenstein, S. (1979). Rating the risks. *Environment*, 21(3), 14-20, 36-39.
- Slovic, P., Fischhoff, B., & Lichtenstein, S. (1980). Facts and fears: Understanding perceived risk. In R. Schwing & J. Albers (Eds.), *Societal risk assessment: How safe is safe enough?* New York: Plenum.
- Slovic, P., Weber, U, E. (2002). Perception of risk posed by extreme events. In Risk management strategies in an uncertain world, *Palisades*, New York, (1-21)
- Spearman, C. (1904). *General intelligence objectively determined and measured*. American Journal of Psychology, 15, 201-293.
- Spektor, A. (2004). September 11th victims list. Referenced examples for electronic sourced materials. Retrieved 1st Apr 2008 from http://www.september11victims.com/september11victims/victims_list.htm
- Spencer, R. (2007). *Religion of Peace?: Why Christianity Is and Islam Isn't*. Regnery Publishing, c.2007.

- Stangor, C. (1998). *Research methods for the behavioural sciences*. Boston: Houghton Mifflin, c1998.
- Starr, C. (1969). *Social benefit vs technological risk*. *Science*. 1232-1238
- Stevens, G. (2007). *Psychosocial Aspects of CBRN Terrorism*. [Unpublished report]. Available from School of Medicine, University of Western Sydney, Locked Bag 1797, Penrith South, DC NSW, 1797, Australia.
- Szymanski, S., Zimbalist, S, A. (2006). *National Pastime: How Americans Play Baseball And the Rest of the World Plays Soccer*. Brookings Institution Press, c.2006.
- The 9/11 Commission report: Final report of the national commission on terrorist attacks upon the United States*. (2004). U.S. Government Printing Office, c.2004
- Thietart, A, R et al (1999). *Doing management research: A comprehensive guide* London; Thousand Oaks, Calif.: SAGE, c1999.
- Thurstone, L. L (1994). *A Law of Comparative Judgement*. *Psychological Review*. 101(2), 266-270.
- Thorndike, M, R. (1997). *Measurement and evaluation in psychology and education*. (6th Ed) Upper Saddle River, N.J: Merrill, c1997.
- Thyer, A, B. (2001). *The handbook of social work research methods*. Thousand Oaks, Calif.: Sage Publications, c.2001.
- Trochim, M.,K.,W. (2006). *Social research methods: Knowledge database*. Referenced examples for electronic sourced materials. Retrieved 19th Mar 2008 from http://www.socialresearchmethods.net/kb/stat_t.php
- Tversky, A., & Kahneman, D. (1973). *Availability: A heuristic for judging frequency and probability*. *Cognitive Psychology*, 5, 207-232.
- Tversky, A., Kahneman, D., Slovic, P. (1982). *Judgment Under Uncertainty: Heuristics and Biase*. *Cambridge University Press*, c.1982

Uebersax J, S. (2006). *Statistical methods for rater agreement. Likert scales: Dispelling the confusion*. Referenced examples for electronic sourced materials. Retrieved 15th Apr 2008 from <http://ourworld.compuserve.com/homepages/jsuebersax/likert2.htm>.

United Nations. (2001). The administrative committee on coordination subcommittee on water resources report. *Proceedings of the twenty second world meteorological organization conference*. Geneva, Switzerland.

University of Maryland. (2007). Study of terrorism and responses to terror. Referenced examples for electronic sourced materials. Retrieved 13th Oct 2008 from <http://www.start.umd.edu/data/gtd/>

Walliman, N. (2006). *Social research methods*. Sage Publications, c.2006.

Whitten, C., Thompson, S. (2007). *When cultures collide: Planning for the public spatial needs of Muslim women in Sydney*. Referenced examples for electronic sourced materials. Retrieved 23rd June 2007 from http://www.griffith.edu.au/conference/soac2005/published_papers/social_city/soc07a.pdf

Wissler, C. (1901). *The correlation of mental and physical tests*. Psychological Review, Monograph No. 3.

Williams, D. (2003). [Media Statement]. Attorney-General: National security booklet for every household. Referenced examples for electronic sourced materials. Retrieved 13th Aug 2007 from http://www.nationalsecurity.gov.au/agd/WWW/NationalSecurity.nsf/Page/News_Media_2003_Media_Statements_Media_Releases_1st_Quarter_03_February_2003_Attorney_General:_National_Security_Booklet_for_every_Household

Williams, H, R., Zumbo, D, B., Ross, D., Zimmerman, W, D. (2003). *On the Intellectual Versatility of Karl Pearson*. Human Nature Review 3. 296-301

World of Sociology. (2006). *Rensis Likert Biography*. Referenced examples for electronic sourced materials. Retrieved 24th Aug 2008 from <http://www.bookrags.com/biography/rensis-likert-soc/>

Yerkes, M, R. (1918). *Measuring the mental strength of the army*. Proceedings of the National Academy of Sciences 4, (10), 295-297

Young, A, S. (2007). *Government communication in Australia*. Cambridge University Press, c.2007.

Zalta, N. E. (2006). *Wilhelm Maximilian Wundt*. The Stanford Encyclopaedia of Philosophy, Stanford University Stanford, CA, c2006.

Appendix A Australian Anti-Terrorism based Legislation introduced from 2002

- The Security Legislation Amendment (Terrorism) Act 2002,
- The Telecommunications Interception Legislation Amendment Act 2002,
- The Border Security Legislation Amendment Act 2002
- The Suppression of the Financing of Terrorism Act 2002
- The Criminal Code Amendment (Suppression of Terrorist Bombings) Act 2002
- The Criminal Code Amendment (Offences Against Australians) Act 2002
- The Criminal Code Amendment (Anti-Hoax and Other Measures) Act 2002.
- The Criminal Code Amendment (Espionage and Related Matters) Act 2002
- The Crimes Amendment Act 2002

(Attorney-General's Department 2007b).

- Australian Security Intelligence Organisation Legislation Amendment (Terrorism) Act 2002
- Crimes Amendment Bill 2002
- Criminal Code Amendment (Terrorist Organisations) Bill 2002
- Charter of the United Nations Amendment Bill 2002
- Charter of the United Nations (Terrorism and Dealings with Assets) Regulations 2002
- Criminal Code Amendment (Terrorism) Bill 2002

(Australian Parliamentary Library, 2008).

- Australian Security Intelligence Organisation Legislation Amendment (Terrorism) Act 2003
- ASIO Legislation Amendment Act 2003
- The Maritime Transport and Offshore Facilities Security Act 2003
- Criminal Code Amendment (Terrorist Organisations) Act 2004
- International Transfer of Prisoners Amendment Act 2004
- Telecommunications (Interception) Amendment Act 2004
- The Aviation Transport Security Act 2004
- Anti-terrorism Act 2004.
- The Surveillance Devices Act 2004
- The National Security Information (Criminal and Civil Proceedings) Act 2004

(Attorney General's Department Annual Report 2003-2004, p.76).

- Aviation Transport Security Bill 2003
- Criminal Code Amendment (Terrorist Organisations) Bill 2003
- Criminal Code Amendment (Hizballah) Bill 2003
- Criminal Code Amendment (Hezbollah External Terrorist Organisation) Bill 2003
- Maritime Transport Security Bill 2003
- Criminal Code Amendment (Hamas and Lashkar-e-Tayyiba) Bill 2003
- Anti-terrorism Bill 2004
- Telecommunications (Interception) Amendment (Stored Communications) Bill 2004
- National Security Information (Criminal Proceedings) (Consequential Amendments) Bill 2004
- National Security Information (Criminal Proceedings) Bill 2004
- Crimes Legislation Amendment (Telecommunications Offences and Other Measures) (No. 2) Bill 2004
- Aviation Security Amendment Bill 2004

(Australian Parliamentary Library, 2008a).

- The National Security Information Legislation Amendment Act 2005
- The Crimes Amendment Act 2005
- Anti-Terrorism Act (No. 2) 2005

(Attorney Generals Department, 2006).

- National Security Information Legislation Amendment Bill 2005
- Maritime Transport Security Amendment Bill 2005
- Maritime Transport and Offshore Facilities Security Amendment (Maritime Security Guards and Other Measures) Bill 2005
- Law and Justice Legislation Amendment (Video Link Evidence and Other Measures) Bill 2005
- Anti-Terrorism Bill 2005
- Telecommunications (Interception) Amendment Bill 2006
- Maritime Transport and Offshore Facilities Security Amendment (Security Plans and Other Measures) Bill 2006

- Customs Legislation Amendment (Border Compliance and Other Measures) Bill 2006
- Aviation Transport Security Amendment Bill 2006
- ASIO Legislation Amendment Bill 2006
- Non-Proliferation Legislation Amendment Bill 2006
- Law and Justice Legislation Amendment (Marking of Plastic Explosives) Bill 2006
- Anti Money Laundering and Counter Terrorism Financing Act 2006
- Crimes Legislation Amendment (National Investigative Powers and Witness Protection) Bill 2006
- Fighting Words: A Review of Sedition Laws in Australia (ALRC 104) 2006
- Aviation Transport Security Amendment (Additional Screening Measures) Bill 2007
- Aviation Legislation Amendment (2007 Measures No. 1) Bill 2007
- Communications Legislation Amendment (Crime or Terrorism Related Internet Content) Bill 2007
- Telecommunications (Interception and Access) Amendment Bill 2007
- Classification (Publications, Films and Computer Games) Amendment (Terrorist Material) Bill 2007
- Communications Legislation Amendment (Crime or Terrorism Related Internet Content) Bill 2007
- The Law and Justice Legislation Amendment (Marking of Plastic Explosives) Act 2007
- Aviation Transport Security Amendment (Additional Screening Measures) Bill 2007

(Australian Parliamentary Library, 2008a)

Appendix B

Terrorist Attacks Involving Australian Fatalities, Injuries or Damage to Australian Interests

DATE	TERRORIST GROUP	COUNTRY/ AREA	TARGET	TACTIC	WEAPON	FATALITIES	INJURIES
10/21/70	Croatian Nationalists	Australia / Melbourne	Yugoslav Consulate/ Military	Bombing	Explosives	0	0
11/23/71	Croatian Nationalists	Australia / Sydney	Yugoslav Travel Agency	Bombing	Explosives	0	0
09/17/72	Croatian Nationalists	Australia / Brisbane	Yugoslav Tourist Office	Bombing	Explosives	0	0
12/08/72	Unknown	Australia / Brisbane	United States Citizen	Bombing	Explosives	1	0
12/24/74	Unknown	Australia / Sydney	Pan American Airlines Office	Bombing	Fire or Fire bomb	0	0
10-19-77	Ananda Marga	Australia / Melbourne	Airline Office	Armed Attack	Knives	0	1
02/13/78	Ananda Marga	Australia / Sydney	Sydney Hilton Hotel / Diplomatic	Bombing	Explosives	2	9
05/27/78	Unknown	Australia / Sydney	Residence, Indian Ambassador/ Military	Bombing	Explosives	0	0
01/04/79	Unknown	Australia / Canberra	Government Residence	Bombing	Explosives	0	0
03/31/79	Unknown	Australia / Perth	Boans Department Store	Bombing	Explosives	0	9
11/06/80	Unknown	Australia / Sydney	Residence Italy's Honorary Vice Consul	Armed Attack	Firearms	0	1
11/30/80	Unknown	Australia / Newcastle	Diplomatic Woolworths Store	Bombing	Explosives	0	0
12/17/80	Justice Commandos for the Armenian Genocide	Australia / Sydney	Turkish General and Bodyguard/ Military	Assassination	Firearms	2	0
12/24/80	Extortionists	Australia / Sydney	Woolworth's store	Bombing	Explosives	0	2
12/28/80	Extortionists	Australia / Liverpool	Woolworths store	Bombing	Explosives	0	0
11/16/81	Unknown	Australia / Sydney	Greece Consul-General to Australia	Assassination	Knives	1	0
12/23/82	Palestine Liberation Organization	Australia / Sydney	Israeli Consulate	Bombing	Explosives	0	3
05/07/83	Unknown	Australia / Sydney	Business, Union Carbide	Bombing	Explosives	0	0

03/27/86	Unknown	Australia / Melbourne	Police Headquarters	Bombing	Explosives	0	21
11/23/86	Greek Bulgarian Armenian Front	Australia / Melbourne	Turkish Consulate	Bombing	Explosives	1	1
01/19/87	Anti Turkish Group	Australia / Brisbane	Government Facility / Roma Street Mail Exchange	Bombing	Fire or Fire bomb	6	0
04/10/88	Unknown	Australia / Canberra	Vehicle South. Africa Embassy/ Diplomatic	Bombing	Fire or Fire bomb	0	0
07/18/88	Unknown	Australia / Canberra	United States Police Vehicle	Bombing	Explosives	0	0
12/21/88	Unknown	Australia / Adelaide	Australian Police Vehicle	Bombing	Explosives	0	0
01/30/89	Unknown	Australia / Sydney	Residence South African ANC	Armed Attack	Firearms	0	0
10/27/89	Unknown	Australia / Sydney	Representative Residence, United States Embassy	Bombing	Fire or Fire bomb	0	0
01/24/91	Unknown	Australia / Sydney	Employee Rooty Hill Islamic Centre,	Bombing	Fire or Fire bomb	0	0
02/19/91	Unknown	Australia / Sydney	Military Australian- American Association Building	Bombing	Fire or Fire bomb	0	0
08/18/91	Unknown	Australia / Sydney	Shopping Centre	Armed Attack	Firearms	8	6
09/03/91	Unknown	Australia / Perth	Western Australian Government Lotteries Commission	Bombing	Explosives	0	0
09/03/91	Unknown	Australia / Perth	Business, Corfil Cafe	Bombing	Explosives	0	0
01/11/92	Unknown	Australia / Brisbane	U.S. Consulate	Bombing	Fire or Fire bomb	0	0
04/05/92	Anti-Iran Government Exiles	Australia / Canberra	Iranian Embassy, Diplomatic	Unknown	Unknown	0	3
07/28/92	Unknown	Australia / Melbourne	Business, Armoured Van	Armed Attack	Firearms	1	1
11/12/92	East Timorese Activists	Australia / Darwin	Indonesian Consulate, Diplomatic	Unknown	Unknown	0	0
01/28/94	Zapatista National Liberation Army	Australia / Sydney	Mexican Consulate, Diplomatic	Armed Attack	Fire or Fire bomb	0	0
03/02/94	Unknown	Australia /	Police Office	Bombing	Knives Explosives	1	5

03/14/94	Unknown	Adelaide Australia / Melbourne	Greek- Australian Organization	Bombing	Explosives	0	0
03/18/94	Unknown	Australia / Sydney	St. Efimias Greek Orthodox Church	Bombing	Fire or Fire bomb	0	0
03/25/94	Kurds	Australia / Melbourne	German Consulate, Diplomatic	Unknown	Unknown	0	0
09/05/94	Asian Gang	Australia / Canberra	Australian Government Official	Assassin- ation	Firearms	0	0
09/19/94	Unknown	Australia / Melbourne	Student & Alleged Police Informant	Bombing	Explosives	0	1
10/13/94	Unknown	Australia / Gawler	Australian Citizen	Bombing	Explosives	1	2
10/25/94	Unknown	Australia / Perth	Police Station HQ Hostage / Kidnapping	Armed Attack	Firearms	1	0
06/03/95	Neo-Nazi Group	Australia / Townsville	Australian Resident	Unknown	Unknown	0	0
06/17/95	Pacific Popular Front	Australia / Perth	French Consulate, Diplomatic	Bombing	Fire or Fire bomb	0	0
06/22/95	Unknown	Australia / Sydney	Business, Serbian Restaurant	Bombing	Fire or Fire bomb	0	0
07/21/95	Anti-Nuclear Group	Australia / Canberra	French Embassy, Diplomatic	Unknown	Unknown	0	0
09/08/95	Unknown	Australia / Canberra	Business, French Bakery	Assault	Unknown	0	0
08/03/96	Unknown	Australia / Coffs Harbour	Government Offices	Bombing	Explosives	0	0
08/15/96	Unknown	Australia / Adelaide	Australian Citizens, Business	Armed Attack	Firearms	2	1
08/19/96	Opposition Group	Australia / Canberra	Government Parliament Building	Armed Attack	Knives	0	60
10/23/96	Unknown	Australia / Sydney	Transportation Subway System	Bombing	Explosives	0	0
10/27/96	Unknown	Australia / Sydney	Transportation Subway System	Bombing	Explosives	0	0
10/31/96	Unknown	Australia / Sydney	Transportation Subway System	Bombing	Explosives	0	0
02/26/97	Unknown	Australia / Sydney	Business, Shopping Centre	Facility Attack	Chemical Agent	0	4
02/28/97	Unknown	Australia /	Business,	Facility	Chemical	0	19

08/21/97	Unknown	Sydney Australia / Canberra	Supermarket Residence of Australian Government Official	Attack Bombing	Agent Explosives	0	0
09/21/97	Unknown	Australia / Sydney	Transportation / Ferry	Bombing	Explosives	0	0
09/22/98	Unknown	Australia / Darwin	Business/ Energy Resources Australia	Bombing	Fire or Fire bomb	0	0
11/01/98	Unknown	Australia / Sydney	Lakemba Police Station	Armed Assault	Firearms	0	0
12/02/98	Individual	Australia / Sydney	Federal Privacy Commissioner	Explosives/ Bombs	Letter bombs	0	0
12/02/98	Individual	Australia / Canberra	Australian Postal Service Distribution Centre	Explosives/ Bombs	Letter bombs	0	2
12/02/98	Individual	Australia / Melbourne	Former Federal Sex Discrimination Commissioner	Explosives/ Bombs	Letter bombs	0	0
12/03/98	Individual	Australia / Queensland	Residence of a Government Employee	Explosives/ Bombs	Letter bombs	0	0
12/28/98	Islamic Jihad Organization. Islamist (Sunni)	Yemen/ Sana'a	Hostage Taking Kidnapping/ Tourists	Armed Attack	Firearms/ Rocket Projectiles	3	Unknown
06/27/99	Unknown	Nigeria	Kidnapping Employees of Shell Oil	Unknown	Unknown	0	0
11/05/99	Unknown	Indonesia/ Atambua	Private Citizens & Property	Armed Assault	Firearms	0	0
10/17/02	Individual	Australia / Sydney	Transportation / Rail / Cityrail	Sniper Attack	Firearms	0	0
07/16/01	Unknown	Australia / Melbourne	Abortion Clinic	Armed Attack	Firearms	1	0
09/11/01	Al - Qaeda	America / New York	Business/ World Trade Centre	Unconventio nal Attack	Aircraft	2752 (10 Aust)	2261
09/23/01	Unknown	Australia / Brisbane	Islamic Mosque	Incendiary	Arson/ Fire	0	0
11/30/01	September 11	New Zealand/ Wellington	Australian British, U.S. Consulates/ Diplomatic	CBRN Attack	Poisoning/ Cyanide	0	0
05/02/02	Fuerzas Armadas Revolucionaria s de Colombia (FARC)	Colombia/ Puerto Bolivar	Transportation , Rail Attack, Business, BHP Billiton	Bombing	Explosives	0	Unknown
10-12-02	Jemmah Islamiya	Indonesia/	Tourists	Bombing	Suicide Bombs	202 (89 Aust)	300

		Bali					
02/21/03	September 11	New Zealand/ Auckland	Australian British, U.S. Consulates/ Diplomatic	CBRN Attack	Poisoning/ Cyanide	0	0
05/12/03	Al - Qaeda	Saudi Arabia/ Riyadh	Military Base	Bombing	Truck Bomb	1 (Aust)	0
05/28/03	Unknown	Australia / Melbourne	Melbourne Stock Exchange	Bombing	Explosives	0	0
02/22/04	Taliban/ Islamic Extremist (Sunni)	Afghanistan/ Panjva'i, Kandahar	Private Military Contractors/ Transportation Aviation	Armed Attack	Firearms	1 (Aust)	3
03/30/04	Individual	Malaysia/ Kuala Lumpur	Australian High Commission/ Diplomatic	Bombing	Explosives	0	0
09/09/04	Jemmah Islamiya	Indonesia/ Jakarta	Australian High Commission/ Diplomatic	Bombing	Truck Bomb	10	182 1 (Aust)
05/01/04	Al-Qa'ida Islamic Extremist (Sunni)	Saudi Arabia/ Yanbu' al Bahr, Al Madinah	Businesses Hotel Retail School Police	Bombing/ Armed Attack	Improvised Explosive Device (IED) Firearms	6 1 (Aust)	19
06/27/04	Unknown	Iraq/ Baghdad	Australian Military Transport Plane	Armed Attack	Firearms	1	0
10/16/04	Unknown	Iraq/ Baghdad	Kidnapping Australian Journalist	Unknown	Unknown	0	0
10/25/04	Al-Qa'ida in Iraq	Iraq/ Baghdad	Australian Military Convoy	Bombing	Vehicle Bomb (IED)	3	16 3 (Aust)
01/19/05	Tanzim Qa'idat al- Jihad fi Bilad al-Rafidayn (QJBR)	Iraq/ Baghdad	Australian Embassy/ Diplomatic	Bombing	Vehicle Bomb (IED)	2	4 2 (Aust)
03/09/05	Unknown	Malaysia/ Kuala Lumpur	Australian High Commission/ Diplomatic	Bombing	IED Explosive	0	1
03/21/05	Unknown	Iraq/ Baghdad	Australian Embassy/ Diplomatic	Bombing	Mortar/ Artillery; Missile/ Rocket	0	0
04/20/05	Unknown	Iraq/ Baghdad	Vehicle Attack Civilian Convoy	Armed Attack	Firearms	3 1 (Aust)	1
05/01/05	The Shura Council of the	Iraq/ Baghdad	Australian Government	Kidnapping	Firearms	0	0

05/07/05	Mujahedeen of Iraq Tanzim Qa'idat al-Jihad fi Bilad al-Rafidayn (QJBR)	Iraq/ Baghdad	Employee/ Contractor Civilian Security Convoy	Suicide Bombing	IED Vehicle Bomb	22	59 1 (Aust)
07/07/05	Islamic Extremist (Sunni)	England London	Private Citizens/ Train and Bus Attack	Suicide Bombing	IED	52 1 (Aust)	700
07/13/05	Palestinian	Gaza Strip/ Burayj	Humanitarian/ NGO	Kidnapping	Unknown	0	0
07/28/05	Jenin Martyrs Brigade	Gaza Strip/ Burayj	United Nations Officials & Police	Kidnapping	Firearm	0	0
10/01/05	Jemaah Islamiya Organization	Indonesia/ Bali	Private Citizens/ Tourists	Bombing	Suicide Bombing	26 (4 Aust)	129 (17 Aust)
03/14/06	Popular Front for the Liberation of Palestine (PFLP)	Gaza Strip/ Gaza City	8 Journalists, 2 Healthcare & 5 NGO workers, 1 Educator, 2 Civilians	Kidnapping	Unknown	0	0
03/21/06	Unknown	Malaysia/ Selangor	Australian Residence	Arson/ Fire bombing	Firebomb/ Incendiary	0	0
04/24/06	Egyptian Islamic Extremist (Unknown)	Egypt/ Dahab, Janub Sina'	Public Place/Retail Hotel	Suicide Bombing	IED Explosive	18	62 1 (Aust)
06/08/06	Unknown	Iraq/ Al Basrah	Private Military Contractors Convoy	Bombing	IED Explosive	4 1 (Aust)	0
08/03/06	Unknown	Iraq/ Baghdad	Private Military Contractors Convoy	Bombing	IED Explosive	4 1 (Aust)	0
09/04/06	Unknown	Jordan/ Amman	Tourists	Armed Attack	Firearm	1	6 1 (Aust)
05/03/07	Taliban	Afghanistan/ Tarin Kowt, Oruzgan	Australian Soldier Military/ Civilians	Suicide Bombing	IED Explosive	0	3 1 (Aust)
05/03/07	The Movement for the Emancipation of the Niger Delta (MEND)	Nigeria Rivers	Civilian Oil Workers/ Energy Infrastructure	Kidnapping	Firearm	0	0
07/04/07	Unknown	Nigeria Rivers	Civilian Oil Workers/ Energy	Kidnapping	Firearm	0	0
07/15/07	Unknown	Iraq/ Baghdad	Government Contractors	Bombing	IED Explosive	2	2

10/03/07	New Peoples Army. Philippines Secular, Political/ Anarchist	Philippines/ Labo, Camarines Norte	Convoy Australian Mining Company Facility	Theft/ Arson/ Fire bombing	Firebomb/ Incendiary/ Firearm	2 (Aust) 0	1 (Aust) 0
10/05/07	Unknown	East Timor/ Dili	Australian Defence Force Compound/ Military	Bombing	Grenade	0	0

Table 1.1 Terrorist Attacks Involving Australian Fatalities, Injuries or Damage to Australian Interests (Adapted from the National Counter Terrorism Centre Rand / University of Maryland, 2007)

Edith Cowan University
School of Engineering and Mathematics



INFORMATION LETTER

POST 9/11: A STUDY INTO THE WESTERN AUSTRALIAN PUBLIC'S PERCEPTION OF AUSTRALIA'S NATIONAL SECURITY

This research project aims to examine how the events of September 11th 2001 have affected the Western Australian public and their perceptions of terrorism. You have been selected at random to participate in this study. The research side of the project involves participants completing an opinion based questionnaire on the subject of terrorism. You will be asked to indicate how strongly you agree or disagree with 8 statements. This will take approximately 5 minutes of your time.

Information provided by you will be used to analyse the current trend in public thinking regarding terrorism. Access to this information in its raw state is restricted to the researcher and the project supervisor. All consent forms and questionnaires will be stored in a safe with no identifying characteristics to link consent forms to individual questionnaires. Results of this research study will be published as part of an Honours dissertation; however the dissertation will not include information that may identify individual participants. After the research is complete, all raw data will be handed to the university for secure storage as per their requirements, and any remaining raw data held by the researcher will be destroyed.

Your agreement to participate in this study is voluntary. No explanation or justification is needed if you choose not to participate, and you are free to withdraw your consent at any time. If you would like to participate in this study, please read and sign the informed consent attached and return it to the researcher.

This research project is being undertaken as part of the requirements of an Honours degree at the Faculty of Computing, Health and Science, Edith Cowan University (ECU). Approval has been given by the ECU Human Research Ethics Committee.

If you have any questions or require further information about the research project please contact Richard Sargent on [REDACTED] or rsargent@student.ecu.edu.au

If you have any concerns or complaints about the research project and wish to talk to an independent person, you may contact:

Research Ethics Officer
Edith Cowan University
100 Joondalup Drive
JOONDALUP WA 6027
08 6304 2170
research.ethics@ecu.edu.au

Thank you for your time.

Edith Cowan University
School of Engineering and Mathematics



INFORMED CONSENT

*POST 9/11: A STUDY INTO THE WESTERN AUSTRALIAN
PUBLIC'S
PERCEPTION OF AUSTRALIA'S NATIONAL SECURITY*

I..... (full name) confirm that I have received, read and understood the information provided in the Information Letter, explaining this research study. I have been given the opportunity to ask questions and any questions have been answered to my satisfaction. I am aware that if I have any additional questions I can contact the researcher. I understand that participation in this research project will involve answering 8 opinion based questions on the subject of terrorism. I understand that my answers will be kept confidential, that they will be used only for the purposes of this research project and my identity will not be disclosed without my consent. I am aware that I am free to withdraw from further participation at any time, without explanation or penalty.

I confirm that I have freely agreed to participate in this project and I am over 18 years of age.

Signed

Date/....../....

Edith Cowan University
School of Engineering and Mathematics



POST 9/11: WESTERN AUSTRALIA'S PUBLIC PERCEPTION OF NATIONAL SECURITY

The survey is composed of **two** parts:

Part 1 is a general survey which gathers demographic information about the respondent.

Part 2 is a psychometric survey designed to gauge a person's attitude towards five different activities or technologies.

Participation in this study is completely voluntary and you will remain anonymous. You are free to withdraw your consent at any time. Due to ethical considerations participants must be over 18 years old to take part in this survey.

Part 1: Demographics

Please **circle** your gender:

Male

Female

Please **circle** your age range:

18-25

26-35

36-45

46-55

56-65

65+

Part 2 of this survey is designed to measure your attitude towards a range of five different activities or technologies. The survey's format uses a Likert based composition, the aim of which is to gauge a person's attitude toward certain issues. Please circle only **one** option which best represents your feelings.

For example, if you strongly agreed with the following statement, you would circle (1):

I believe too much junk food is bad for my health.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	1	2	3	4	5

Please **circle** the first answer which comes to mind. There are **no wrong answers**.

Part 2: Psychometric Survey

MICROWAVE OVENS	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Experts do not fully understand the risks associated with microwave ovens.	1	2	3	4	5
2. I know when I am exposed to the risks associated with microwave ovens.	1	2	3	4	5
3. The effects of being exposed to the risks of using microwave ovens are known immediately.	1	2	3	4	5
4. Exposure to the risks of using a microwave oven could seriously damage my health.	1	2	3	4	5
5. On a gut reaction, I dread the risks from using microwave ovens.	1	2	3	4	5
6. Safety campaigns related to microwave ovens have made me more vigilant to the associated risks.	1	2	3	4	5
7. The risks from microwave oven usage pose a high risk to my future generations.	1	2	3	4	5
8. Current government regulation does not adequately control the risks related to microwave ovens.	1	2	3	4	5

APPLIANCE FIRES	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Experts do not fully understand the risks associated with appliance fires.	1	2	3	4	5
2. I know when I am exposed to the risks associated with appliance fires.	1	2	3	4	5
3. The effects of being exposed to the risks of appliance fires are known immediately.	1	2	3	4	5
4. Exposure to the risks of appliance fires could seriously damage my health.	1	2	3	4	5
5. On a gut reaction, I dread the risks from appliance fires.	1	2	3	4	5
6. Safety campaigns related to appliance fires have made me more vigilant to the associated risks.	1	2	3	4	5
7. The risks from appliance fires pose a high risk to my future generations.	1	2	3	4	5
8. Current government regulation does not adequately control the risks from appliance fires.	1	2	3	4	5

Part 2: Psychometric Survey Continued

COAL BURNING	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Experts do not fully understand the risks associated with pollution from coal burning.	1	2	3	4	5
2. I know when I am exposed to the risks associated with pollution from coal burning.	1	2	3	4	5
3. The effects of being exposed to pollution from coal burning are known immediately.	1	2	3	4	5
4. Exposure to the risks of pollution from coal burning could seriously damage my health.	1	2	3	4	5
5. On a gut reaction, I dread the risks from pollution from coal burning.	1	2	3	4	5
6. Safety campaigns related to pollution from coal burning have made me more vigilant to the associated risks.	1	2	3	4	5
7. The risks of pollution from coal burning pose a high risk to my future generations.	1	2	3	4	5
8. Current government regulation does not adequately control the risks of pollution from coal burning.	1	2	3	4	5

COMMERCIAL AVIATION	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Experts do not fully understand the risks associated with commercial aviation.	1	2	3	4	5
2. I know when I am exposed to the risks associated with commercial aviation.	1	2	3	4	5
3. The effects of being exposed to the risks from commercial aviation are known immediately.	1	2	3	4	5
4. Exposure to the risks from commercial aviation could seriously damage my health.	1	2	3	4	5
5. On a gut reaction, I dread the risks from commercial aviation.	1	2	3	4	5
6. Safety campaigns related to commercial aviation have made me more vigilant to the associated risks.	1	2	3	4	5
7. The risks of commercial aviation pose a high risk to my future generations.	1	2	3	4	5
8. Current government regulation does not adequately control the risks from commercial aviation.	1	2	3	4	5

Terrorism Definition

A definition of terrorism is provided in order to assist the participant in answering the last section of the survey.

“A terrorist act is defined under Australian law as an act or threat, intended to advance a political, ideological or religious cause by coercing or intimidating an Australian or foreign government or the public, by causing serious harm to people or property, creating a serious risk to the health and safety to the public, or seriously disrupting trade, critical infrastructure or electronic systems.”

(The Commonwealth Criminal Code Act, 1995, p.119)

TERRORISM IN AUSTRALIA	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Experts do not fully understand the risks associated with an Australia-based terrorist act.	1	2	3	4	5
2. I know when I am exposed to the risks associated with an Australia-based terrorist act.	1	2	3	4	5
3. The effects of being exposed to an Australia-based terrorist act are known immediately.	1	2	3	4	5
4. Exposure to the risks of an Australia-based terrorist act could seriously damage my health.	1	2	3	4	5
5. On a gut reaction, I dread the risks from an Australia-based terrorist act.	1	2	3	4	5
6. Safety campaigns related to an Australia-based terrorist act have made me more vigilant to the associated risks.	1	2	3	4	5
7. The risks an Australia-based terrorist act pose a high risk to my future generations.	1	2	3	4	5
8. Current government regulation does not adequately control the risks from an Australia-based terrorist act.	1	2	3	4	5

THANK YOU FOR YOUR TIME

Appendix F

Principal Australian Security Improvements Post 9/11

Program Areas	Australian Government Protection Initiatives
Protection of Critical Information and Communications Infrastructure	<ol style="list-style-type: none"> 1. The Attorney Generals Department (AGD) and Australian Federal Police (AFP) received \$89.2 million dollars to identify, investigate and develop tools for technology-enabled crimes. 2. \$12.4 million to enhance the <u>Australian Government's Computer Emergency Readiness Team</u> capacity to inform owners about threats.
Critical Infrastructure Protection	<ol style="list-style-type: none"> 1. <u>Good Security—Good Business</u> booklet 2. Trusted Information Sharing Network 3. Business Government Advisory group 4. ASIO's Business Liaison Unit 5. The Critical Infrastructure Protection Project. 6. AusCheck: Security Identification Cards
Law Enforcement Support	<ol style="list-style-type: none"> 1. Specialised joint AFP operations / training facilities to enhance capacity 2. New Chemical, Biological, Radiological and Nuclear (CBRN) Data Centre. 3. 5.2 million to improve Emergency Management Australia's (EMA's) first response capabilities to CBRN attacks.
Enhanced Intelligence Efforts	<ol style="list-style-type: none"> 1. Significant increases in ASIO's budget and staff to boost technical, intelligence, analytical, surveillance/border security capabilities. 2. New purpose built central ASIO's office to accommodate staff increases.
Strong Legislative Frameworks	<ol style="list-style-type: none"> 1. A legislative commitment has been made to ensure federal agencies have legal power to uphold Australian anti-terrorism commitments. 2. Significant acts introduced to provide security against terrorism include: Anti Terrorism Act (No.2) 2005 3. National Security Information (Criminal and Civil Proceedings) Act 2004. 4. <u>Anti Money Laundering and Counter Terrorism Financing Act 2006</u> 5. <u>Law and Justice Legislation Amendment (Marking of Plastic Explosives) Act 2007</u>
Border Protection	<ol style="list-style-type: none"> 1. \$79.5 million to enhance the Border Protection Command and to develop the Australian Maritime Identification System 2. Increases in mobile x-rays vans and explosive detector dog teams
Terrorism Response	<ol style="list-style-type: none"> 1. \$24.7 million to enhance the National Counter-Terrorism Committee (NCTC) anti-terrorism agency response program 2. Establishment of the Protective Security Coordination Centre (PSCC) 3. Emergency Management Australia's <u>Working Together to Manage Emergencies</u> community initiative
International Counter Terrorism Partnerships	<ol style="list-style-type: none"> 1. AFP International Liaison Network 2. \$36.8 million to develop Jakarta's Centre for Law Enforcement Cooperation 3. AFP Technical, investigations / forensic training in the Philippines and Thailand 4. Australia's Bomb Data Centre is training enforcement agencies in the Philippines, Malaysia, Thailand and Indonesia. 5. AUSTRAC is helping to prevent terrorism financing/money laundering in the region
Public Counter Terrorism Partnership	<ol style="list-style-type: none"> 1. \$20 million dollar investment into public national security public information campaigns to promote vigilance and action. 2. Enhancement of the national security hotline

Table 6.1 Principal Australian Security Improvements Post 9/11 (Adapted from the Attorney General Departments, 2007c)